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It solves the most complex equations in seconds. Whether you're a scientist, engineer, financial analyst, student, teacher, or some other professional, you need Eureka: The Solver!

Any problem that can be expressed as a linear or non-linear equation can be solved with Eureka. Algebra, Trigonometry and Calculus problems are a snap.

Eureka: The Solver also handles maximization and minimization problems, does plot functions, generates reports, and saves you an incredible amount of time.

X+exp(X) = 10 solved instantly instead of eventually!

Imagine you have to "solve for X," where X + exp(X) = 10, and you don't have Eureka: The Solver. What you do have is a problem, because it's going to take a lot of time guessing at "X." Maybe your guesses get closer and closer to the right answer, but it's also getting closer and closer to midnight and you're doing it the hard way.

With Eureka: The Solver, there's no guessing, no dancing in the dark—you get the right answer, right now. (PS: X = 2.0705799, and Eureka solved that one in .4 of a second!)

How to use Eureka: The Solver

It's easy.

1. *Enter your equation into the full-screen editor*
2. *Select the "Solve" command*
3. *Look at the answer*
4. *You're done*

You can then tell Eureka to

- *Evaluate your solution*
- *Plot a graph*
- *Generate a report, then send the output to your printer, disk file or screen*
- *Or all of the above*

Eureka: The Solver includes

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- ☑ *Pull-down menus*
- ☑ *Context-sensitive Help*
- ☑ *On-screen calculator*
- ☑ *Automatic 8087 math co-processor chip support*
- ☑ *Powerful financial functions*
- ☑ *Built-in and user-defined math and financial functions*
- ☑ *Ability to generate reports complete with plots and lists*
- ☑ *Polynomial finder*
- ☑ *Inequality solutions*

*Introductory price—good through July 1, 1987

Some of Eureka's key features

You can key in:

- ☑ *A formula or formulas*
- ☑ *A series of equations—and solve for all variables*
- ☑ *Constraints (like X has to be < or = 2)*
- ☑ *A function to plot*
- ☑ *Unit conversions*
- ☑ *Maximization and minimization problems*
- ☑ *Interest Rate/Present Value calculations*
- ☑ *Variables we call "What happens?," like "What happens if I change this variable to 21 and that variable to 27?"*

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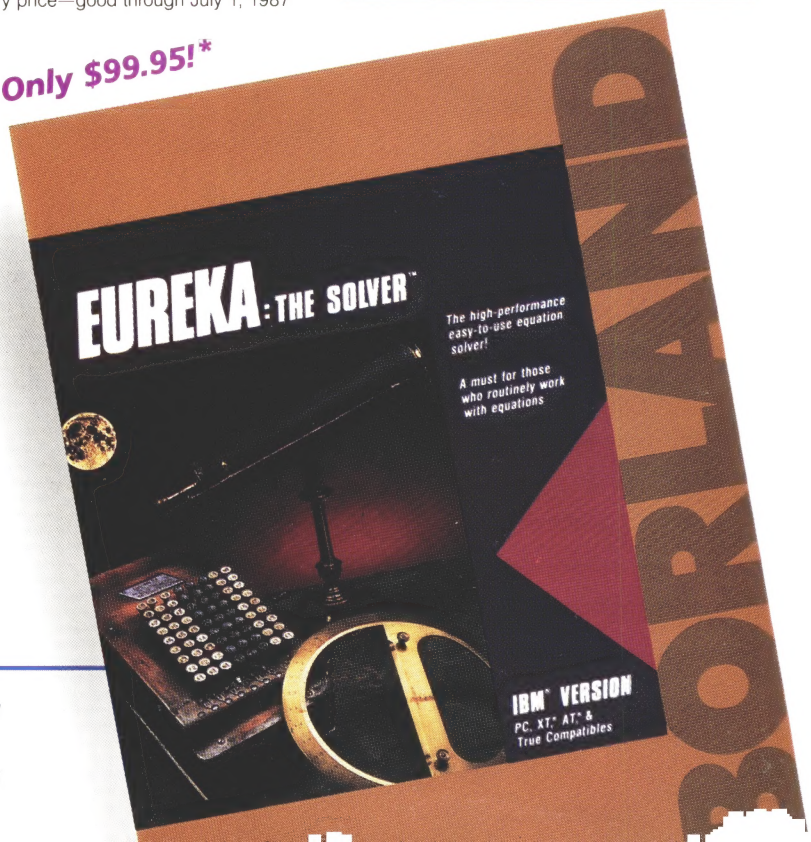

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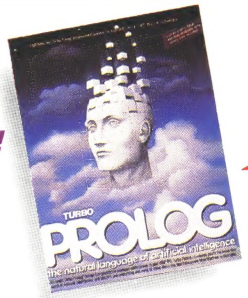

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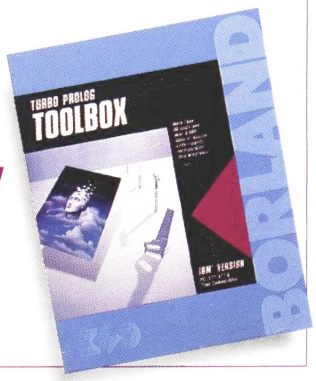

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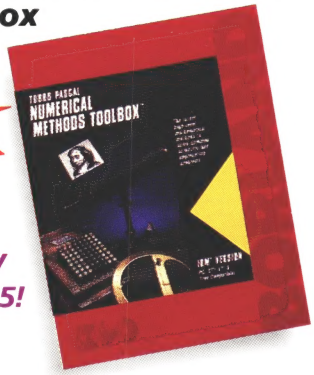

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Free spreadsheet included, complete with source code!

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A technical look at Turbo Basic

- ☑ *Full recursion supported*
- ☑ *Standard IEEE floating-point format*
- ☑ *Floating-point support, with full 8087 (math co-processor) integration. Software emulation if no 8087 present*
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System requirements

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System requirements

IBM PC, XT, AT and true compatibles. PC-DOS (MS-DOS) 2.0 or later. One floppy drive. 320K.

Technical Specifications

- ☑ *Compiler: One-pass compiler generating linkable object modules and inline assembler. Included is Borland's high performance "Turbo Linker." The object module is compatible with the PC-DOS linker. Supports tiny, small, compact, medium, large, and huge memory model libraries. Can mix models with near and far pointers. Includes floating point emulator (utilizes 8087/80287 if installed).*
- ☑ *Interactive Editor: The system includes a powerful, interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code.*
- ☑ *Development Environment: A powerful "Make" is included so that managing Turbo C program development is highly efficient. Also includes pull-down menus and windows.*
- ☑ *Links with relocatable object modules created using Borland's Turbo Prolog into a single program.*
- ☑ *ANSI C compatible.*
- ☑ *Start-up routine source code included.*
- ☑ *Both command line and integrated environment versions included.*

*Introductory price—good through July 1, 1987

Sieve benchmark (25 iterations)

	Turbo C	Microsoft® C	Lattice C
Compile time	**3.89**	16.37	13.90
Compile and link time	**9.94**	29.06	27.79
Execution time	**5.77**	9.51	13.79
Object code size	**274**	297	301
Price	**$99.95**	$450.00	$500.00

Benchmark run on a 6 Mhz IBM AT using Turbo C version 1.0 and the Turbo Linker version 1.0; Microsoft C version 4.0 and the MS overlay linker version 3.51; Lattice C version 3.1 and the MS object linker version 3.05.

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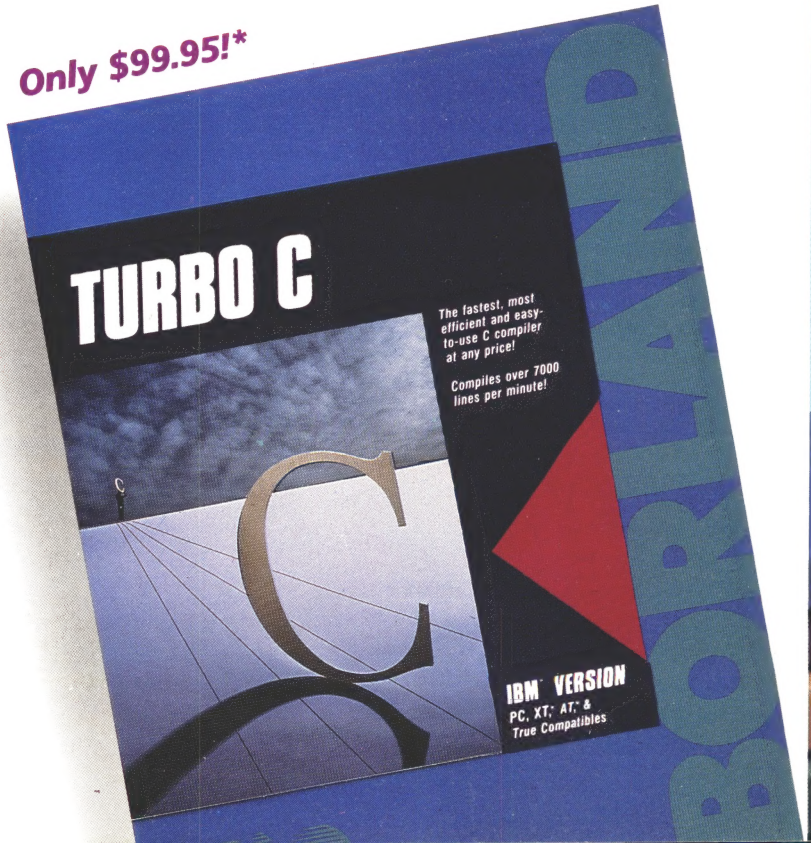

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The Comprehensive Guide to IBM Personal Computers and Compatibles
March 1987

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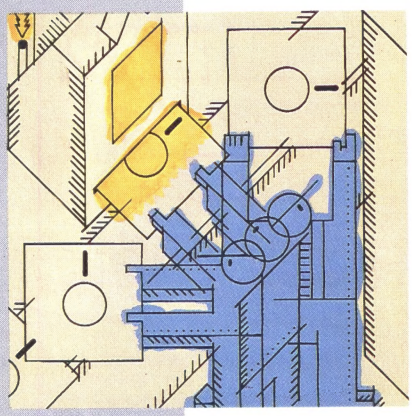

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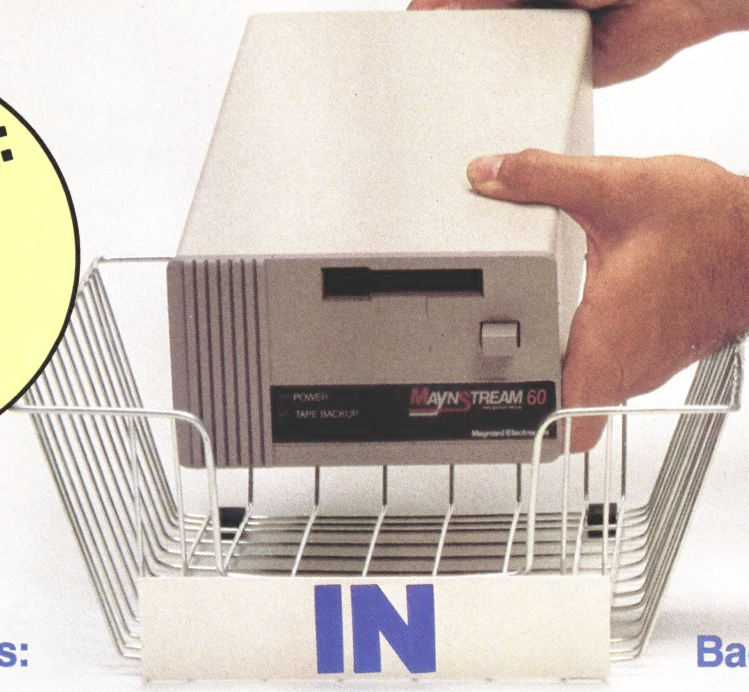

IN

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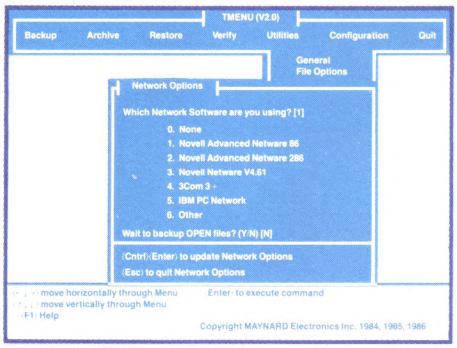

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The MaynStream makes customized backup a reality, giving you unprecedented control over one of your computer's most important functions. Options include **Networking,** which is designed to work with all popular LANs including Novell, 3COM, and IBM's PCNet.* The MaynStream will not only back up a network while the network is up and running, but will actually back up open files automatically once they're closed! *No other system currently on the market can do this!* The MaynStream's other features include **Automatic Save; File & Directory Marking** for backing up select files, directories, and subdirectories; **Archive; Verify;** and **Backup Macros** for unprecedented convenience.

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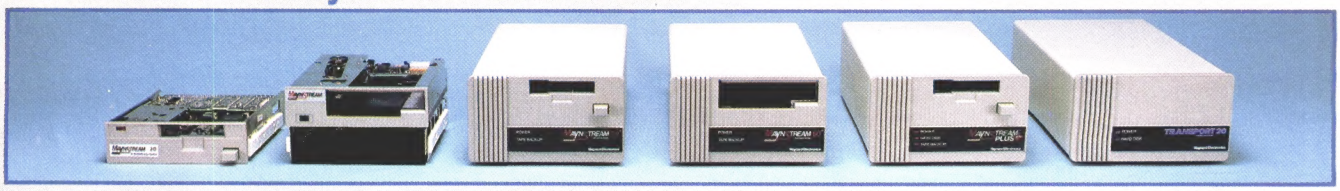

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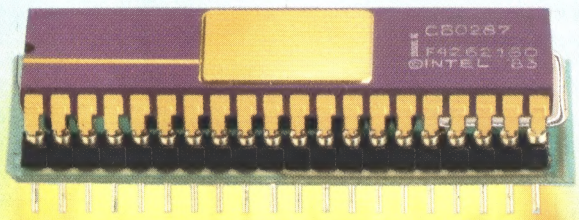

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We bought her the Rampage and the results were incredible. Now, Debbie is able to fully use her expanded memory applications.

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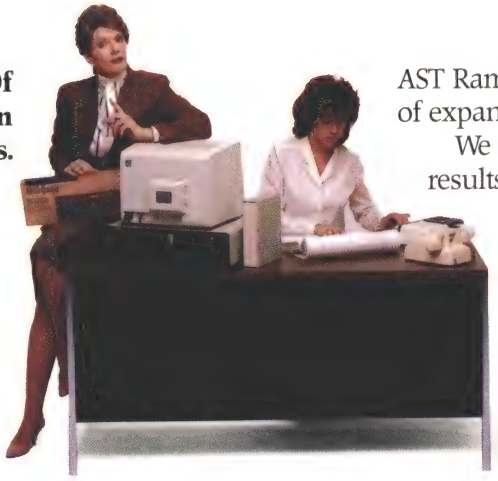

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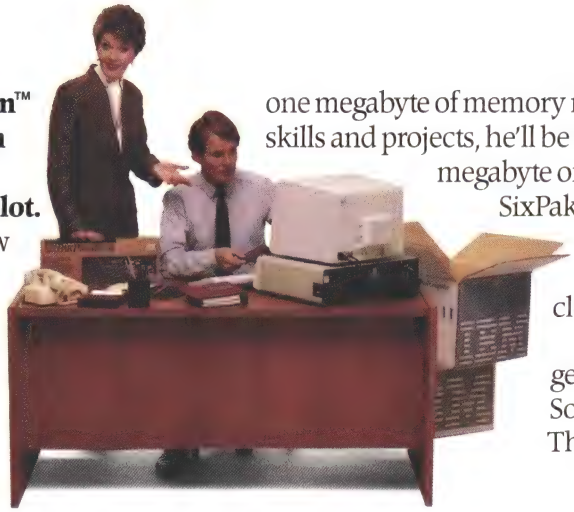

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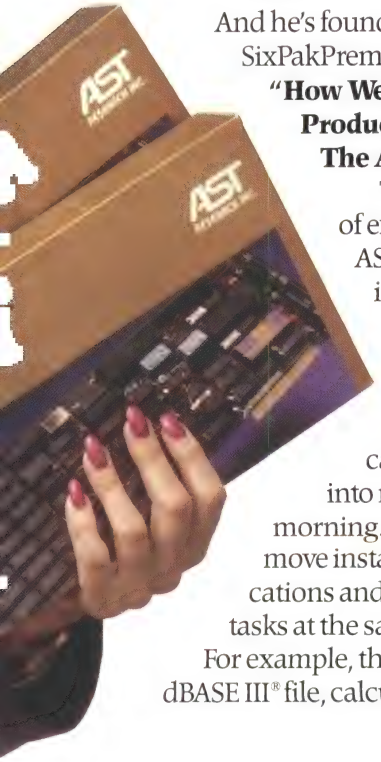

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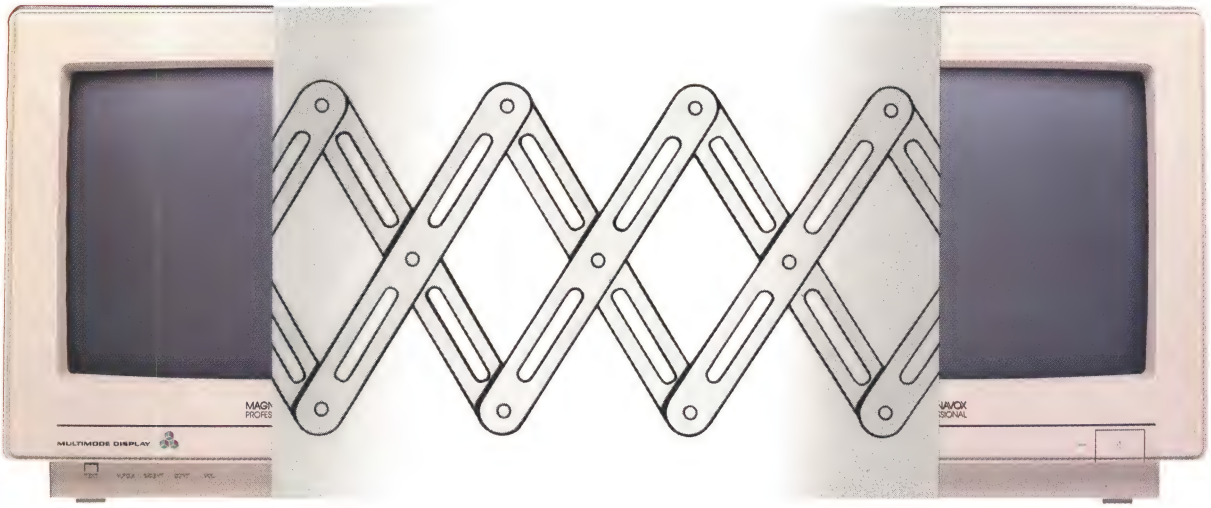

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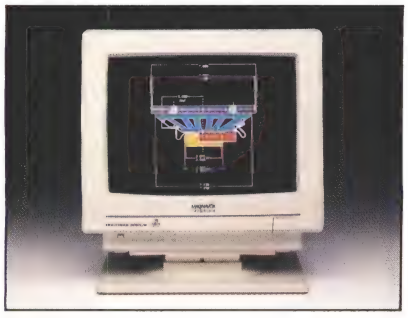

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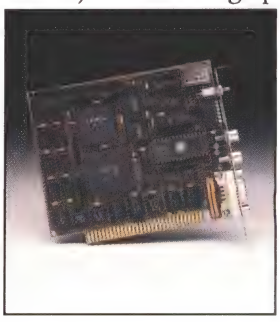

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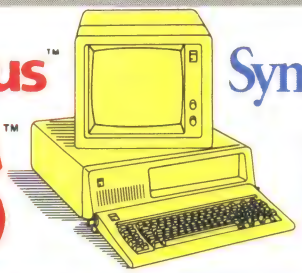

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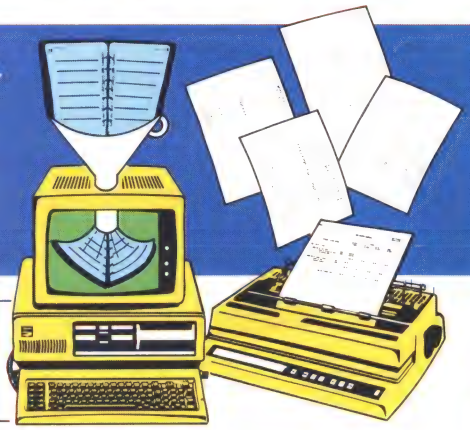

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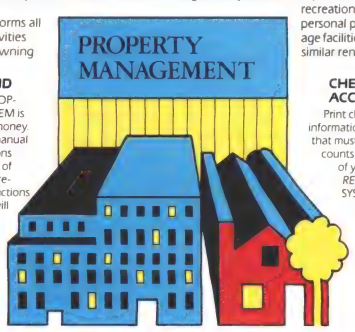

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Numeric Keypad	Separate
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In fact, when you discover everything it comes with, you'll be delighted at what it goes for.

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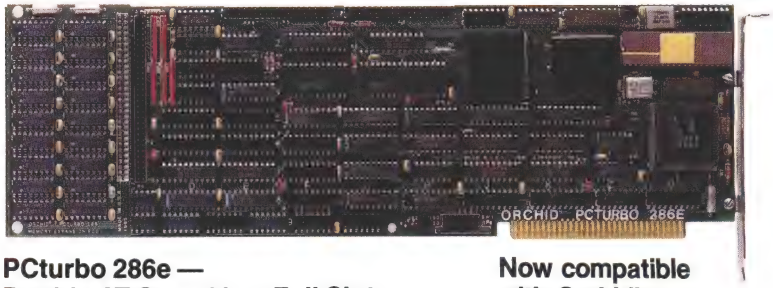

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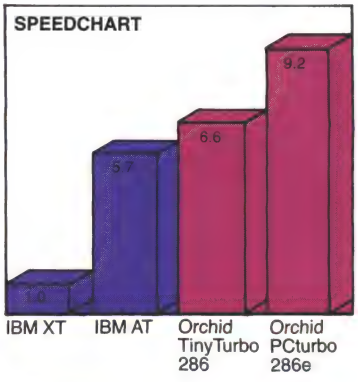

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Circle 472 on reader service card

David Bunnell

Hypervisions

As hypertext and hypervideo usher in a new age of information literacy, all the world's an electronic stage—and you're the media director.

In the next two or three years, more data will be generated and disseminated than in all of recorded history.

Not only is the volume of information increasing at a staggering clip, but the rate of increase is also accelerating phenomenally. The way it's going, our existing knowledge base will be doubling and tripling before we can even say "on line."

This is not just a megatrend. It's a maxifact. And it's going to be one of our biggest headaches in the coming century if we don't get our information act together soon.

The problem is not just the quantity of data. It is *accessibility.* How do you deal with all this information? How do you absorb it? How do you make sense of it? How do you structure it? Most important, how do you access it?

Clearly, the current media forms—television, radio, print, and even electronic publishing—are not equipped to deal with this information onslaught on their own.

What we need is an information medium that will bridge the gaps between the existing media and provide us with ways of coping with massive amounts of information. CD ROM and the development of other broadband publishing technologies will, I believe, constitute this new medium.

Although it's impossible to predict how fast these technologies will evolve, there is no question in my mind that we are on the verge of a new era of information handling.

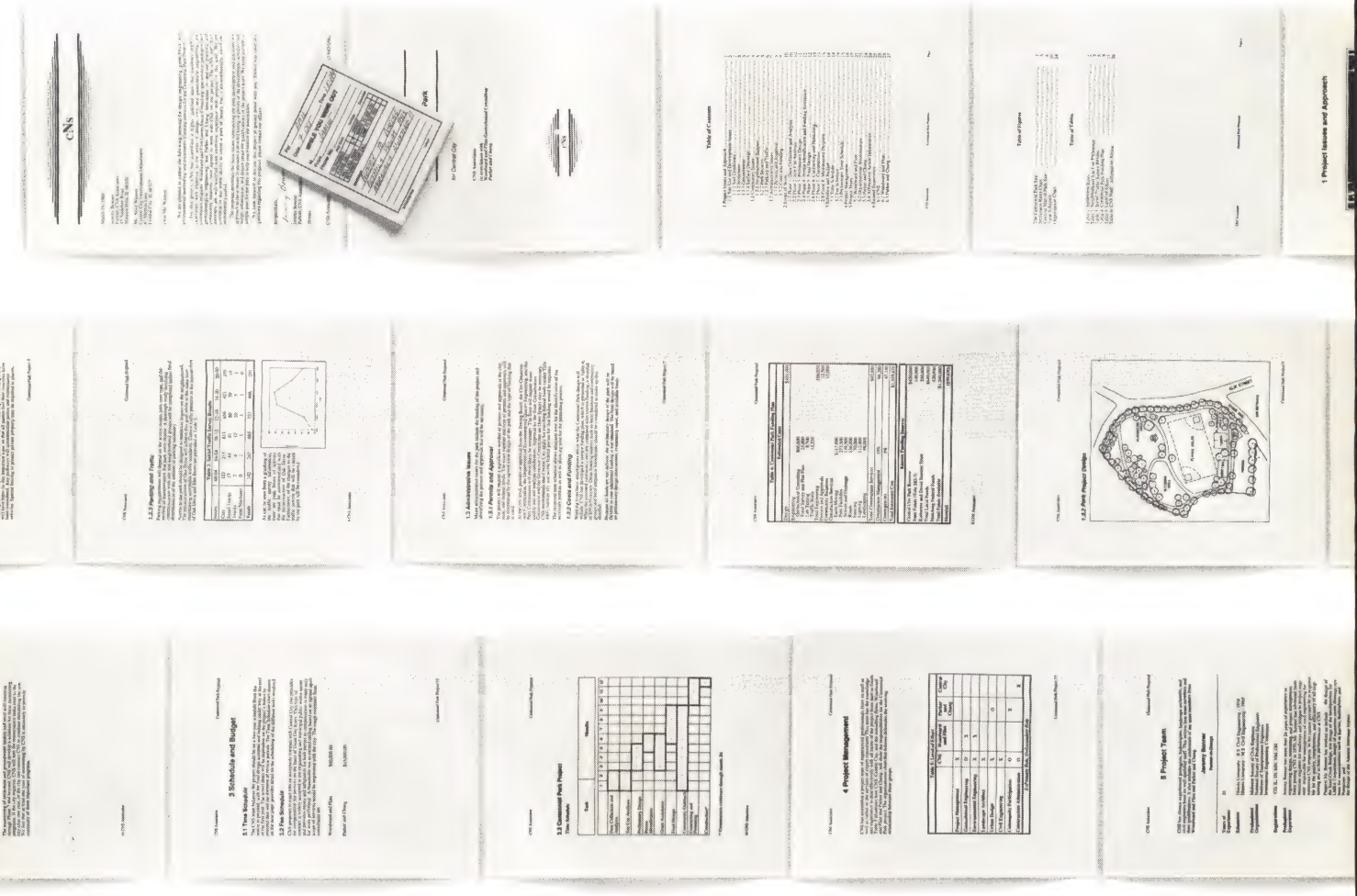
Because broadband electronic publishing—which allows us to mix text, sound, graphics, and video—is a new medium, we will need new information-handling tools to help us grapple with the otherwise indecipherable text of the future.

In my opinion we have one adaptable tool right now. You might even be familiar with it. It's "hypertext."

The concept of hypertext was originally developed back in the sixties by personal computer visionaries Ted (Project Xanadu) Nelson and Doug Engelbart, the genius behind the idea of windows

(continues)

How to process docum



You may be content with your present word processor. And it's easy to understand why.

Even the clumsiest word processor is light years beyond the electric typewriter, the accepted standard only a decade ago. Plus, just the term word processing conjures up a rather modest expectation, ho hum, the ability to process words.

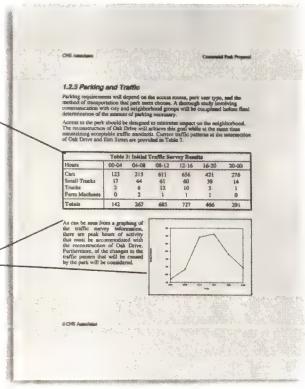
But, the mere processsing of words is hardly the challenge today. When you're creating a 20-page report, an 80-page proposal, a 200-page specification, or just a 2-page letter, you often have to work with graphics, equations, tables and more.

That's simply too much to ask of a product designed to process words. But, that's exactly what you can expect from Lotus Manuscript,™ a word processor that is truly a complete document creation system for technical professionals.

Very often documents require the mixing of text and graphics on the same page, graphics from Lotus® 1-2-3,® Symphony® and Freelance® Plus. With Manuscript you can import spreadsheets and charts, as well as diagrams and scanned images.

Spreadsheets, graphs and charts for 1-2-3® and Symphony® can easily be mixed with text on the same page.

You can throw away your scissors and glue, cut and paste are a thing of the past.

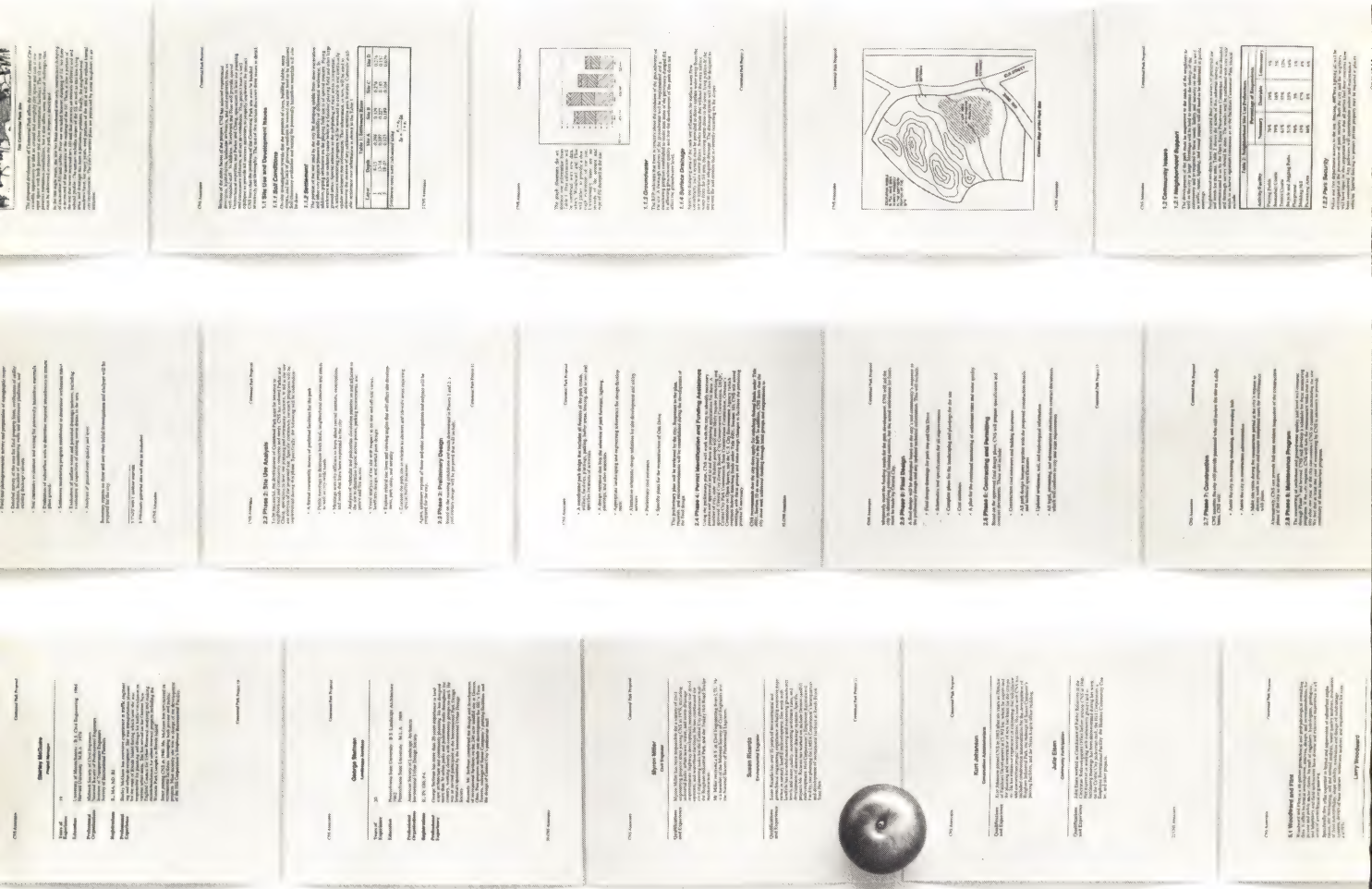


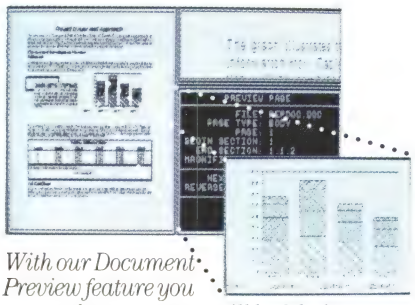
Another feature that goes beyond conventional word processing is Manuscript's integrated Outliner. When you collapse the document you're able to navigate the outline much easier than wading through the entire piece. You can move a page, or even an entire chapter with just a few keystrokes.

Because Manuscript understands the structure of your document, you can globally format an entire document or format by individual sections. Imagine changing all headlines from 14 point plain text to 16 point bold, by a simple menu selection.

Manuscript's Document Com-

ents instead of words.





With our Document Preview feature you can see how any page will look before it's printed. Zoom capability lets you take a closer look at graphics and equations.

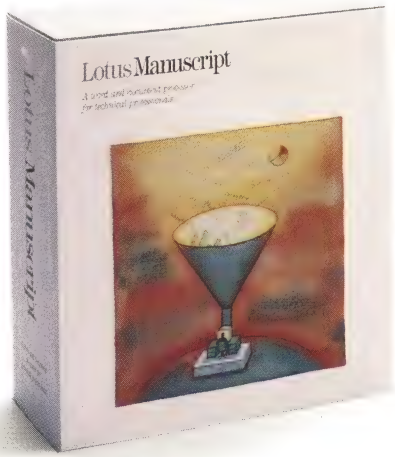
pare feature highlights changes between revisions for fool proof proof-reading.

Also, Manuscript automatically sizes and generates math equations as well as upper and lower case Greek symbols, diacritical marks and brackets.

With our powerful Print Formatter you have complete control over the look of your document, from position and size of graphics, to fonts and point sizes and more.

As for the quality of output, Manuscript takes full advantage of today's printing technology, from dot-matrix to laser, including PostScript® printers.

Manuscript is designed to work on most IBM® PCs and compatibles.* Its familiar 1-2-3 interface makes it easy to use. And our Manuscript evaluation kit makes it easy to try. For $10.00, you'll get a presentation disk, working software, and a tutorial manual. To get your evaluation kit, call 1-800-345-1043, ask for lot #PD-1450. Or, for more information, see your authorized Lotus Dealer, or write Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142



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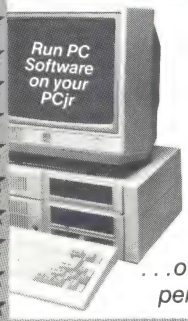

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Circle 937 on reader service card

Matt Herron

Visionaries Doug Englebart (left) and Ted Nelson, who first developed the concept of hypertext in the sixties, speak about today's movement toward nonlinear use of information.

and the mouse. Nelson defines hypertext as nonsequential writing.

"We've actually been doing it for years," he says. "We've been speaking hypertext all our lives and never knew it. It's essentially nonlinearity of speech. The fact that pages have to be numbered because of the way books are built has led us into thinking that things need to be in sequence. But the best expositions are those you pursue yourself, nonsequentially."

As Ted Nelson likes to point out, he never reads a book straight through from the first page to the last. He starts in the middle, then flips to the end or the beginning. He claims that he retains more information that way. I've tried it myself, and I think it's true.

Hyperreading is not exactly an easy process to learn. For years, you've been a "sequencer," and suddenly you have to flip back and forth. It's like learning to read all over again.

Recently, we at PCW Communications took our first step in hyperpublishing when we used OWL Software's *Guide* program to produce an experimental hypertext edition of parts of the January issue of *Macworld* on disk, as well as a similar hypertext issue of *PC World*.

Guide, created by software entrepreneur Alan Boyd, is an ideal hypertext maker because it allows you to organize data base information in a visual way. For example, what appears on the *PC World* editor's computer screen here can represent the page as it

(continues)

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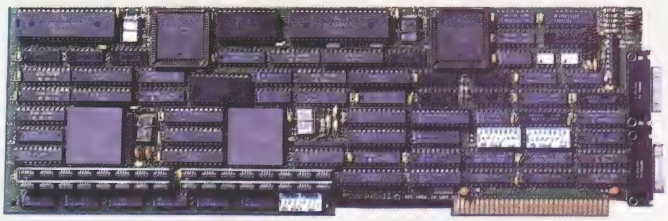

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abc

ABC Company Newsletter — August — Technical Report on Desktop Publishing

Desktop Publishing Terms

At the heart of the personal computer publishing movement is a set of skills almost unknown to anyone outside the typesetting trade. A unique lexicon of terms describes the methods used to arrange letters on a page in an eye-pleasing manner. The typographer's language contains terms dating back to Gutenberg's time.

Crispness and **clarity** are the measures of good typography. These two elements are a function of image resolution, point size and typeface. The eye is very sensitive to the spacing of letters and the placement of words on the page.

Desktop Publishing Systems Sold Worldwide

Thousands: 600, 500, 400, 300, 200, 100, 0

1985, 1990, 1995

US, Europe, Rest of World

Measurements

Pica and **point** are two important words. They are the fundamental units of typographic measurement. A pica equals .166050, or about one-sixth, inch. The pica is in turn divided into 12 points. Using these typesetting terms will ease your communication with the professional graphic arts industry.

A standard measure for open space is the **em**, named for the width of the M, which is usually the widest letter in a typeface's character set. The size of an em is always equal to the current point size. When you're setting a line in 12 point type, an em is 12 points wide.

Related to the em is the **en**, which is equal to half the width of an em or the width of the letter N. The thin space, is a user-definable unit, usually half an en. Typographers adjust the space between letters to improve readability. The process, called **kerning**, is determined by the shapes of the adjacent letters. In *electronic publishing*, typographic attributes are imposed by embedding codes within unformatted text. A hyphenation and justification program then interprets the codes and makes the line-ending decisions.

Because the letter blocks were originally made out of lead alloy, the vertical space between lines of type

Figure 1.1 The art of typography is now combined with the power of the PC.

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XEROX

Now, desktop publishing software of such genius, you don't have to be a 'Leonardo' to use it.

Until now, if you were in the IBM PC world and wanted to join the desktop publishing revolution, the software was hard to use, expensive, and often rewarded you with documents that were technically correct, yet visually disappointing.

Enter Xerox genius for creating perfect documents and a new generation of desktop publishing software—Xerox Ventura Publisher. It combines the best of current page-oriented systems with the best of document-oriented systems to make desktop publishing easy as well as productive.

The special genius of Xerox Ventura Publisher is "stylesheets"—20 built-in formats that arrange text and graphics automatically. Choose a stylesheet (or create your own), combine your text and graphics, and Xerox Ventura Publisher goes to work at the amazing rate of 20,000 characters per second, formatting as many as 64 100-page chapters. Most other programs format a page at a time, just like the cut-and-paste process you're escaping.

It's easy. You manipulate text and graphics with a mouse. What you see is what you get when you print. (Buy a new Xerox full-page display, and you won't have to scroll to see your entire page layout.) Make a change on page 1 and before you can say "Leonardo da Vinci," the entire document reformats. Tables of contents, indexing and numbering of pages, sections, tables, captions and figures are automatic.

Unlike most other programs, Xerox Ventura Publisher runs on a standard IBM PC XT/AT or compatible—AT power is not required. Text can be created on, and converted from, most major word processing programs. Graphics can be imported from many graphics and paint programs—even scanned images are easily incorporated. It supports dot matrix, color ink jet and laser printers as well as PostScript printers and typesetters.

Team Xerox

What price genius? The money you'll save by producing your very first 16-page booklet instead of sending it out will probably cover the cost of your very own Xerox Ventura Publisher software.

Xerox brings out the genius in you.

Xerox Corporation, P.O. Box 24, Rochester, NY 14692. 143B

Begin your career as a desktop publishing "Leonardo" by stopping in at any computer store featuring Xerox desktop publishing software, by calling your local Team Xerox sales office or 1-800-TEAM-XRX, ext. 143B.

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will appear in *PC World* magazine—complete with actual photos, type fonts, and headlines. It can look like the real magazine will look.

I hope that we will soon be able to put a whole year's worth—or even more—of a magazine onto a single CD ROM disk. The key to reading these giant issues will be *Guide*'s hypertext method of accessing information.

With its elegant design—you simply click mini-icons, or buttons, to obtain the information you want—readers will find it a much more friendly and intuitive way to search for information than the traditional method of keyword searches.

Future hypermagazines will be much more impressive than these *Macworld* and *PC World* prototypes.

First of all, it's obvious that simply providing translations of publications from paper to electronic form is not the optimum use of this new medium. We are going to very quickly find ways to enhance the existing information.

For example, a future hypertext issue of *PC World* might contain useful data bases such as directories of personal computer companies with their addresses and phone numbers, lists of computer stores and computer clubs, and so on.

We will also be able to publish lengthy, in-depth tables of products that would not otherwise appear in conventional magazine format because of space limitations.

In due course we will be adding graphics animation to our hypermags. We will be able to show

(continues)

"Dac-Easy Accounting staged an astounding coup in the accounting category..."

PC WORLD
October 1986

150,000 and more every day. That's how many smart buyers have already chosen to save thousands of dollars in their decision to computerize their books. Recently the readers of PC World confirmed this new trend in accounting software by voting Dac-Easy Accounting as their favorite, outperforming the second place finisher with over five times as many votes.

PC WORLD ★ WORLD CLASS CONTEST ★ ACCOUNTING SOFTWARE ★

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6%	Accounting Software, BPI Systems
5%	Easy Business Accounting, Computer Assoc.
4%	Solomon III, TLB Inc.
4%	Accounting Software, Open Systems
4%	Peachtree's Business Accounting System
45%	Others
100%	Total

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Accurate information when you need it is what performance is all about. Fast, flexible reports give you what you need to know to manage cash-flow, inventory turns, pricing and profitability. Dac's seven accounting modules work together perfectly. Enter data once and it's posted to the other modules automatically. Most modules can also be used stand-alone.

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Journal of Financial Accounting, 1985

"I've never before in a review come right out and told readers to buy a product, but I'm doing it now. Dac-Easy is an incredible value."

PC Week, August 27, 1985

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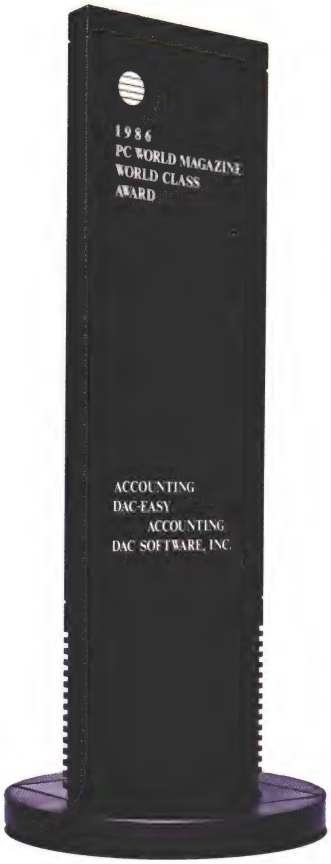

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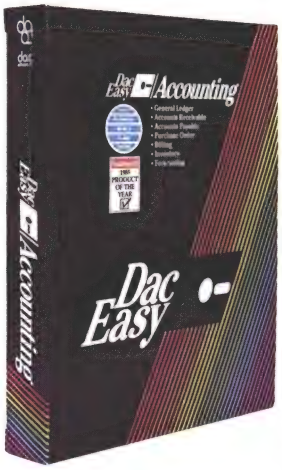

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Features: • Text is automatically centered, character by character, within shapes as you type it • Text formatting controls allow you to over-ride the automatic formating where desired • Lines are created by specifying the starting and ending points - the program automatically generates the route • Cut and paste facility allows arbitrary chart fragments to be moved, copied rotated, reflected or sent to/from disk • Shape insert-delete and row/column insert-delete • Charts can be up to 417 characters wide by 225 lines high. Charts too wide for the printer are automatically printed in strips. • Charts can be larger than the screen - the window into the chart scrolls both horizontally and vertically as necessary • Works with many popular matrix printers including Epson, IBM graphics printer and compatibles. Full support for HP LaserJet and LaserJet Plus. Works with HP 7475A (& compatible) plotters. Can be used with ANY printer when non-graphic (character) output is acceptable • All standard flowcharting shapes included • Most shapes supplied in large, medium and small sizes • Extensive manual (100+ pages) includes many examples • Context sensitive "help" facility provides immediate assistance at any time • Any number of titles can be placed on a chart • Commentary text blocks can be placed anywhere in the chart • Fast: written in assembly language • Plus many more features than we can mention here

Requires at least 320K memory, DOS-2 or higher and an IBM or Hercules compatible graphics card. On EGA, full 640x350 resolution is used.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by MO, check, VISA, MasterCard, COD or Company PO. Rush orders accepted ($15.00 S&H; USA/Canada only). Rush orders received by noon will be delivered the next business day (to most locations).

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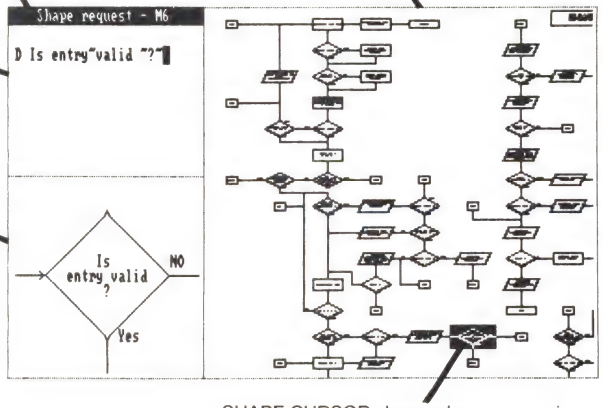
The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting "help" and so on.

STATUS BAR (not to be confused with a wet bar) tells you what Interactive EasyFlow is doing at all times.

CHART WINDOW gives an overview of your chart; this example shows the "normal" view. "Close-up" view shows a smaller part of the chart in more detail. "Wide-angle" view shows a larger part of the chart at reduced size.

TEXT/MESSAGE WINDOW used to enter user text and to display messages from Interactive EasyFlow.

CURRENT SHAPE WINDOW - shows the content of the current flowchart shape (the one under the SHAPE CURSOR) in complete detail.



SHAPE CURSOR shows where you are in the chart. Cursor keys move it around; chart window scrolls if you run off the edge of the window.

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Circle 489 on reader service card

graphs that move and grow, for example, to demonstrate trends. Eventually, we will even have true motion video and film images stored on optical disks or other advanced memory devices.

One of my fondest dreams—or hypervisions, if you will—is one that might not come about until the next century. I like to call this notion hypervideo. It will handle incredible quantities of information. If you can organize words and pictures and charts and photos in hypertext publications, then imagine what you could do with hypervideo.

To start with, I'd love to store all my VCR movies on one giant hypervideo disk that might contain hundreds or even thousands of films.

I could then hyperview anything I wanted from my film collection —say, battle scenes, love scenes, or comedy scenes. I could study the careers of favorite stars like Marilyn Monroe by selecting individual scenes in which they appeared, or entire films. I could program my own anthologies.

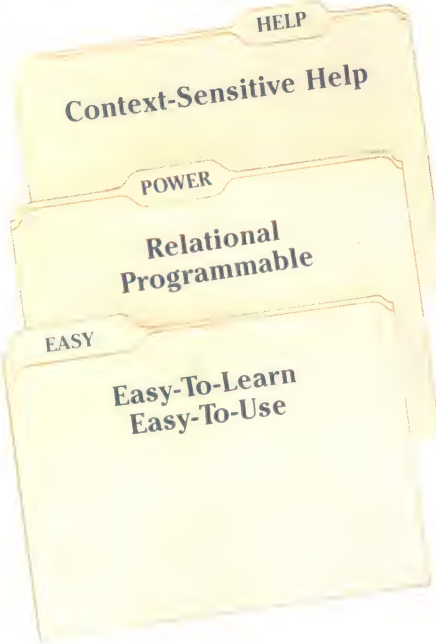
I would probably even be tempted to buy hypervideo anthologies compiled by noted film critics like Pauline Kael. This technology would create a whole new genre of film criticism.

As an extension of this single hypervideo concept, there would be a single device in my home that would capture all the radio, television, and digital information signals (like computer programs

(continues)

ANNOUNCING DAC-EASY BASE

NEW FROM DAC-EASY



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Dac-Easy Base is indeed both powerful and easy to use. It offers a multitude of unique features to help you organize, locate, and sort all kinds of alphabetic and numeric data. Dac-Easy Base continues the low price/high performance tradition of the Dac-Easy Series. With worldwide sales of over 300,000 systems, Dac-Easy has become the new leader in software designed for small businesses.

FLEXIBLE MENU SYSTEM

Dac-Easy Base is actually two systems in one. If you are a novice you will appreciate the special Beginner Menu which contains the most commonly used features for creating, editing, and printing files. The more experienced database user will find the Advanced Menu allows instant access to each and every one of the powerful routines. In both menus, you are only a keystroke away from the context-sensitive help screens. The help screens in Dac-Easy Base are so complete you may never have to consult the accompanying 200 page manual.

EASY FILE AND REPORT CREATION

Design professional-looking data input screens without leaving the menu structure. There is no need for complex programming. Once created, the edit screen allows you to input and edit your information in a matter of minutes. Also attach special notes to any of your records with the built-in MemoWriter. The MemoWriter is the perfect way to attach specific information to a single record. Custom reports are easy to create without using the available programming language. Column or page-style reports can be created quickly, and viewed on your computer screen or printed to paper. As with all reports generated by Dac-Easy Base, you can select which records will be included in your report and how they will be sorted. Special headings and subtotals can be added to give you the exact information you need.

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If only there were

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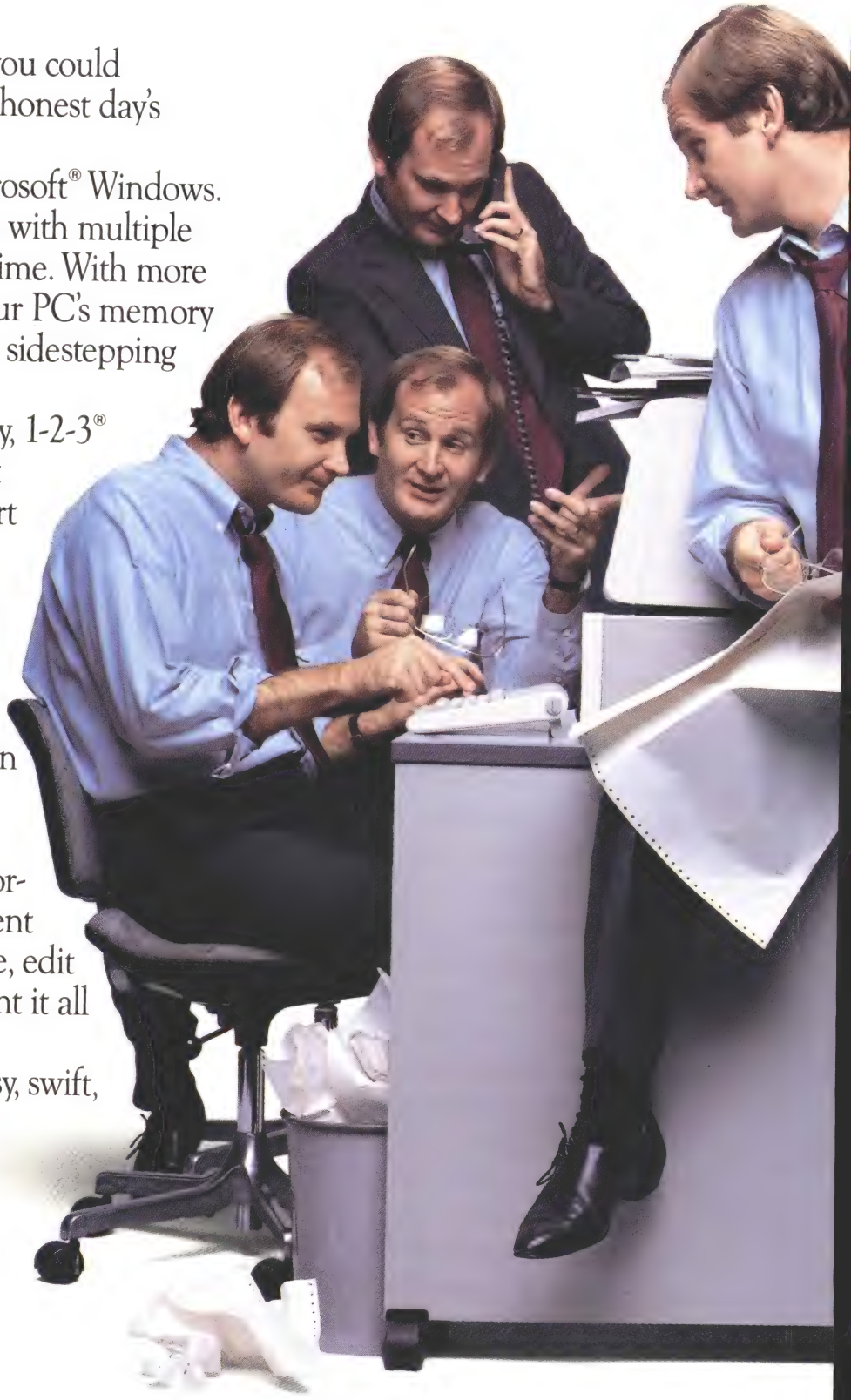
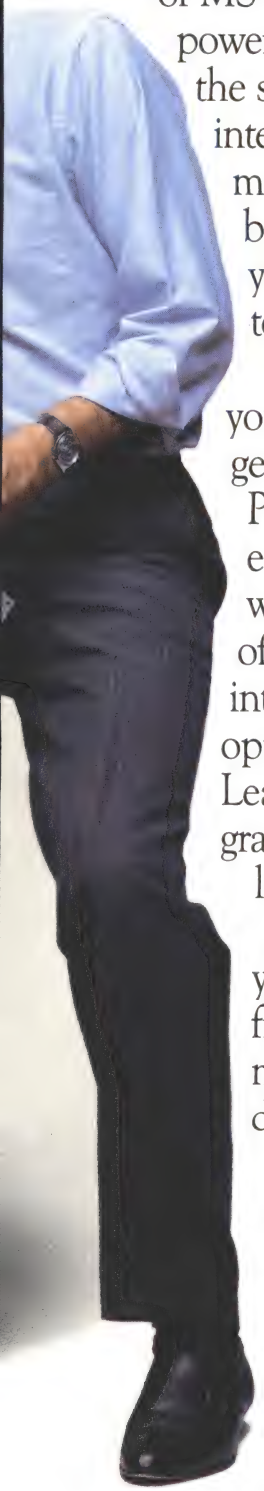


more of you.



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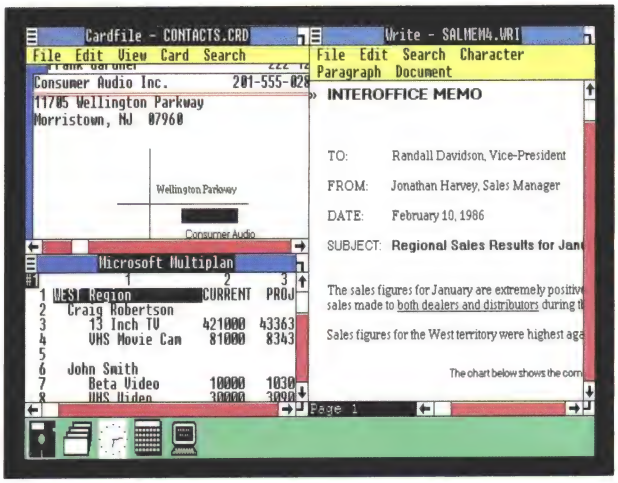

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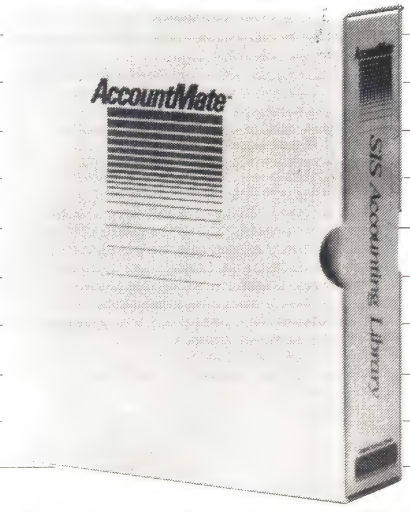

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broadcast on FM bandwidths) that are beamed to my antenna or satellite dish.

All this data would be analyzed by an expert system custom-designed for me. This electronic genie would have come to know me and my special interests over the years. In fact, it might even have helped to develop and shape my interests and sensibilities.

This personal genie would have the task of compiling all the information I might want and then creating menus and indexes or tables of contents, so I could easily make the ultimate decision about what I wanted to look at. It could even create video previews of all this collected material for my viewing-selection pleasure.

Why stop there?

The genie could desktop-publish a personal *TV-Movie-News-Info Guide* for its owner's reference. If you're interested in, say, the aerospace industry, your genie would make sure that you had all the latest bulletins and news flashes on that subject. Now, that would make for an interesting hyperworld, wouldn't it?

But back to the present for a moment.

If hypertext is going to effectively transform the way we structure and deliver information—if it really is the tool we need to help us deal with the massive amount of information that keeps doubling and tripling—then we'll definitely have to hone our hyperskills.

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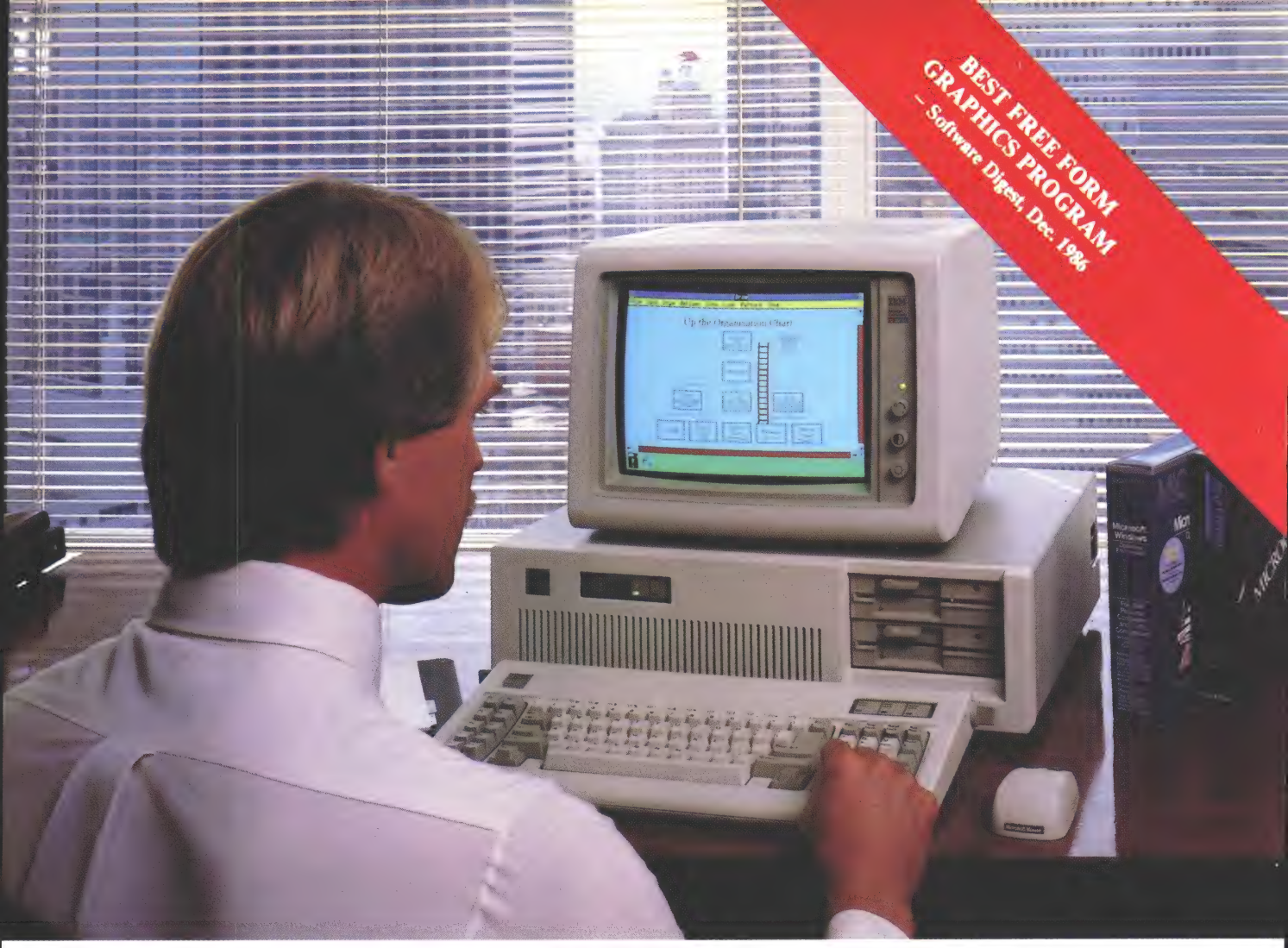

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Rated #1 by Software Digest

Windows Draw is ideal for presentation graphics, desktop publishing, diagrams, forms, flyers, flowcharts — and an endless variety of charts, graphs and illustrations. Use Windows Draw to read Lotus 1-2-3 and Symphony graphs and then enhance them by changing colors and patterns, text styles and sizes. Scale and place them side-by-side for comparison. Even place your enhanced graphs and drawings into Aldus' PC PageMaker for inclusion in your own professional desktop publications. A library of hundreds of hand-crafted clip art images is included so that you don't have to be an artist to add art quality graphics to your publications. In addition, you create and store your own unlimited supply of user defined symbols.

In fact, Software Digest (December, 1986) rated Windows Draw the best overall free form drawing program. Windows Draw was first in power, performance, usability, and ease of use. Moreover, Windows Draw was the least expensive drawing program.

Windows Draw includes an easy-to-follow interactive tutorial. Requires Microsoft Windows-compatible personal computer.

Why wait for your office competition to catch on? Put Windows Draw to work for you right now. Call **800/272-DRAW** to order or for a free reprint of the Software Digest free form graphics ratings. In Texas, or for customer support, call 214/234-1769. Micrografx, Inc., 1820 N. Greenville Ave., Richardson, Texas 75081.

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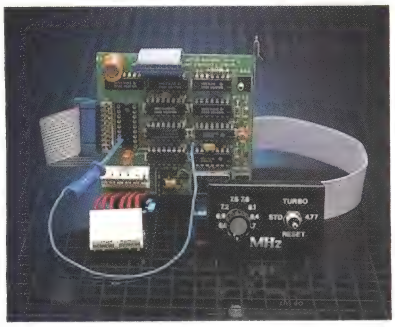

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Griffith's innovative techniques are to film what hypertext is to information. In fact, there is a close parallel between early motion pictures and the development of a new information medium. In its early days, film, too, was a completely new method for conveying information and entertainment.

Similarly, hypertext is going to challenge a new generation of publishers, filmmakers, and broadcasters. Anyone and everyone who is involved in the information/communications business will have to become hyperliterate.

The question is, how are we going to decide the standards of this new information medium? Who is going to set the trends? What technical information do we need to exchange in order to establish the ground rules?

The hyperpublisher of tomorrow is going to need a wide variety of media skills—filmmaking, magazine publishing, news publishing, and data base publishing, to name just a few.

Meanwhile, we need a place or an organization where people from all parts of the information

(continues)

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- Balance forward or open item billing
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- Print statements at any interval
- THE A/R posts cash receipts or invoices to customer accounts, types customer statements and reminder notices, and prints management information reports
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- Checks stock quantities in THE Inventory and notifies you when back orders are required

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- Handles any combination of weekly, biweekly, semimonthly & monthly pay schedules
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- Prints information for government reports
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- Of course, THE Payroll calculates payroll including Federal & State taxes, prints checks, allows hand written checks, lets user maintain tax tables and keeps an extensive employee payroll history

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- User-defined page breaks, soft hyphen, tab, indent and margin settings
- Proportional & justified printing
- Global Search & Replace, Automatic & Examine
- Optional command character viewing
- Superscript and subscript
- Phrase files for boilerplate
- Print bold, centered, underline
- Generate and edit ASCII files
- Right or left justification, and hyphenation

THE Name & Address System:

- Up to 6 labels across and 99 labels per name
- Reads A/R customer and A/P vendor files
- Create name & address files
- Print mailing labels
- Sort files by up to 4 items
- Search or sort by match or range
- Print a report of a NAD file
- Merge files
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- Sort by any character in reference field
- 10 number zip code

THE Mailmerge:

- Integrates THE Wordprocessor & THE Name & Address System
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- Specialized mailings to select groups in your Name & Address System.
- Can read A/R customer file, A/P vendor file and payroll employee file so you may send customized Wordprocessor letters

WindowMaster:

WindowMaster lets you run up to seven programs simultaneously. Run THE Payroll and print checks while you are using THE Wordprocessor. Or enter orders with THE Order Entry while THE Spreadsheet performs a lengthy calculation and THE Mailmerge prints letters for mass mailing. The simple inter-window transfer feature allows you to pass data from one application to another. The powerful keyboard enhancer lets you program keys on your keyboard to perform special functions which would otherwise require many keystrokes. You can also redefine keys. WindowMaster integrates both IRE and other programs and enhances your computer system.

All software runs on the IBM PC, XT, AT, PC Jr. and true compatibles. The accounting packages and WindowMaster require 2 floppy disk drives or a floppy disk and a hard disk drive.

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Circle 78 on reader service card

Daryl Pitt

Software developer Sat Tara Singh Khalsa is creating the Information Institute, "the first interdisciplinary forum for all information technologies." The launch will be later this year in Aspen.

industry can come together to exchange ideas.

The only such development on the horizon that I'm aware of is the new Information Institute being created by Sat Tara Singh Khalsa, the American Sikh software wizard who founded Kriya Systems and created the best-selling *Typing Tutor 3* program.

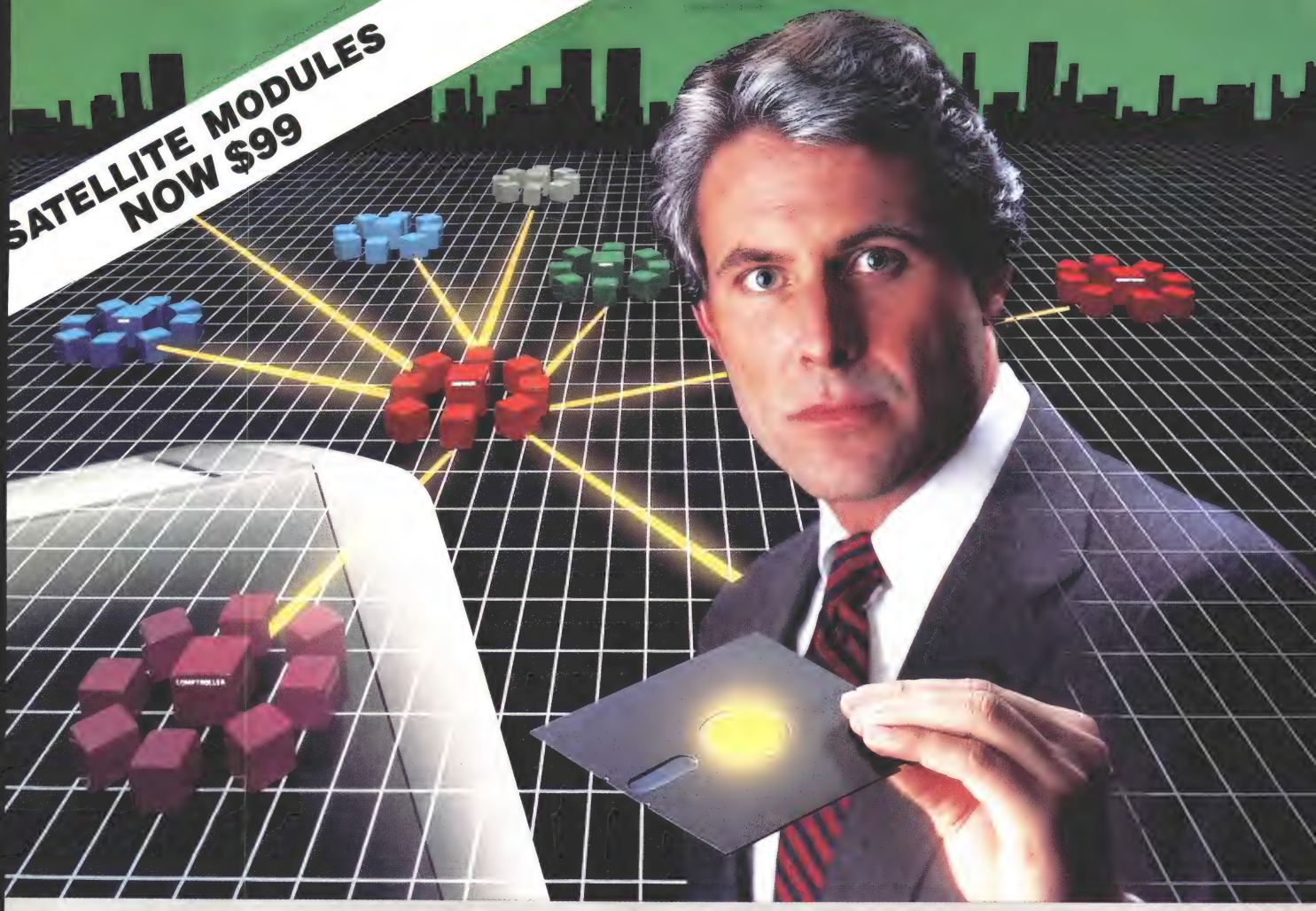
According to Sat Tara, his nonprofit Information Institute is "the first interdisciplinary forum for all information technologies." He plans to launch it this year in Aspen, Colorado.

"We're seeing enormous communications and information conglomerates being built up," he says, "but there is no comfortable fit between media. CBS, for example, has TV, radio, computer software, and books. But each is run as a separate entity. While they all exist under one corporate umbrella, they have an uneasy relationship."

By exchanging ideas, new ideas will emerge for dealing with the diverse entities. Sat Tara's Information Institute can be a place where the relationship between such media will be worked out.

The ultimate goal, of course, is for all of us to be up to speed with our burgeoning twenty-first century information technologies.

Better buckle up to our keyboards. It's time to break through the information barrier.



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Circle 526 on reader service card

Who says you need hardware to speed up your PC?

Personal computers, like automobiles and yachts, are much more rewarding when they're operating at high speed.

And, as with cars and boats, there's more than one way to get your PC moving.

You can, for example, buy an expensive piece of hardware with "turbo" or "accelerator" in its name.

Or you can buy an affordable piece of software with "Norton" in its name.

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And what is the Norton Commander?

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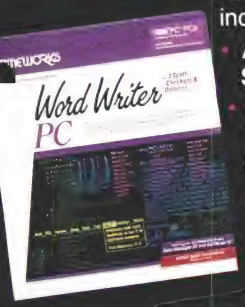

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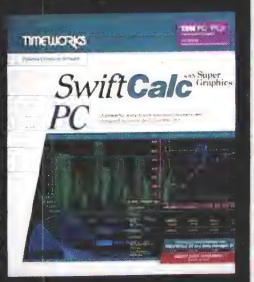

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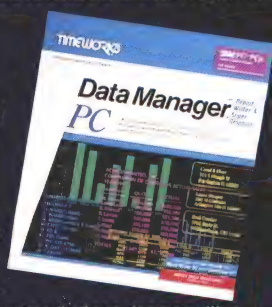

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Resort 460 files by .EXT and be ready for next command	1.3	117.2	2.2	5.2	8.2	3.9	120.1
Find file on disk — worst time	5.2	192.8 (C)	N/A	N/A (D)	30.1	33.5	106.1
Display directory map of drive C -Normal time	0.6	N/A	28.0	N/A	N/A	0.8	24.7
-Worst time	5.5	N/A	28.0	N/A	N/A	31.9	24.7
Return to directory list after running another program	0.1	N/A	29.9	4.2	3.0	3.0	26.8
See files on drive A, then return to map of drive C — worst time	7.2	N/A	31.1	N/A	N/A	34.7	27.6
Edit ANY file (up to 60K) in either normal or HEX mode?	YES!	NO	NO	NO (E)	YES	NO (E)	NO (E)
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These tests were performed on a standard IDS PC clone (8088 processor, 4.77 Mhz), 0 MB Seagate drive, 53 subdirectories, 983 files.

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(A)-No "bootup" time required
(B)-Could only display 449 files
(C)-Using the DOS "TREE /F" command
(D)-Norton's "File Find" (**not** included with Commander) took 28.1 seconds
(E)-Will edit only normal text files

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Letters

Reactions and responses from the PC World community

Save Our Chips

I disagree with David Bunnell's contention in "Fighting PC Protectionism" [*PCW*, December 1986] that the semiconductor trade agreement between the United States and Japan will ultimately have an adverse effect on American consumers. I admit it was difficult at first to accept the apparent price-fixing set in the agreement. But predatory pricing and anticompetitive trade practices are even more difficult to accept.

While I'm a firm believer in capitalism and in allowing markets to set prices, establishing a fair market value for chips actually protects consumers. It essentially prevents a very large company or group of companies from selling chips at a substantial loss for a long period of time to drive their competitors out of business. Without competition, a large manufacturer can charge whatever price it pleases, and the consumer has no choice but to pay that price.

Mr. Bunnell can rest assured that those same types of antitrust laws will also block any attempt by IBM (or anybody else) to acquire Intel to establish a monopoly on the 80386. Perhaps Intel's autonomy is worth more than the entire 80386 market.

Rory Rice
San Antonio, Texas

Lotus Lockout

I recently used a hard disk organizer, *The Seek Stopper*, on my C: drive to make all files contiguous and to cut disk access time. Everything seemed fine until *1-2-3* version 2.01 wouldn't run.

A phone call to Lotus confirmed my suspicion: The copy-protected files won't run if they've been reorganized on the hard disk.

Technical support did mention one interesting fact, however. The latest version of *Disk Optimizer* from SoftLogic Solutions unlocks *1-2-3*'s copy protection without endangering an installed copy. That's not surprising since both *Disk Optimizer* and *1-2-3* use the same copy protection scheme.

Edward Fischer
New York, New York

According to Scott Love of Lotus technical support, the copy protection scheme for 1-2-3 *version 2.01 resides in a hidden directory, so restoring files isn't normally a problem unless you reorganize that particular group of files. Love also says that technical support gets calls regularly about* Disk Optimizer. *He's heard that SoftLogic Solutions has a* 1-2-3 *version 2.01 compatible version of that program in development, but as far as he knows it isn't on the market yet. –Ed.*

A Plus for UNIX

Paul Meyers makes few positive comments in his review of the AT&T 6300 Plus [*From the Hardware Shelf, PCW*, November 1986]. He could have done better.

The designers of the Plus know that many users have large libraries of MS-DOS software. But they also understand that sooner or later these same people will need to use UNIX for networking.

Mr. Meyers apparently had

(continues)

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problems with DOS commands under the Simul-Task Operating System Merge. Most DOS commands work, but he mentions the five that the manual warns against using. There are, however, other system commands that can accomplish the same tasks.

The 6300 Plus affirms the fact that UNIX and MS-DOS can run together. AT&T should be congratulated for this feat.

Bruce Doscher
Hampton Bays, New York

There's ANSI in Your KISS

The QMS Smartwriter was my company's first laser printer. It supports Epson, Qume, and Diablo emulations, as well as the ANSI graphics character set. Recently, the company purchased the less expensive QMS KISS laser printer, which according to its manual doesn't feature the ANSI character set. Since the two printers were otherwise similar, I was surprised that the KISS didn't support ANSI. So I tried using the ANSI commands found in the Smartwriter manual to draw some pictures, and found that they worked on the KISS.

Why QMS chose not to include the ANSI mode in the KISS manual is a mystery. Next, I'm going to look behind the KISS's covered font cartridge slot. I wouldn't be surprised to find that the KISS will also take font cartridges like the Smartwriter.

Peter Steele
Wolfville, Nova Scotia
Canada

(continues)

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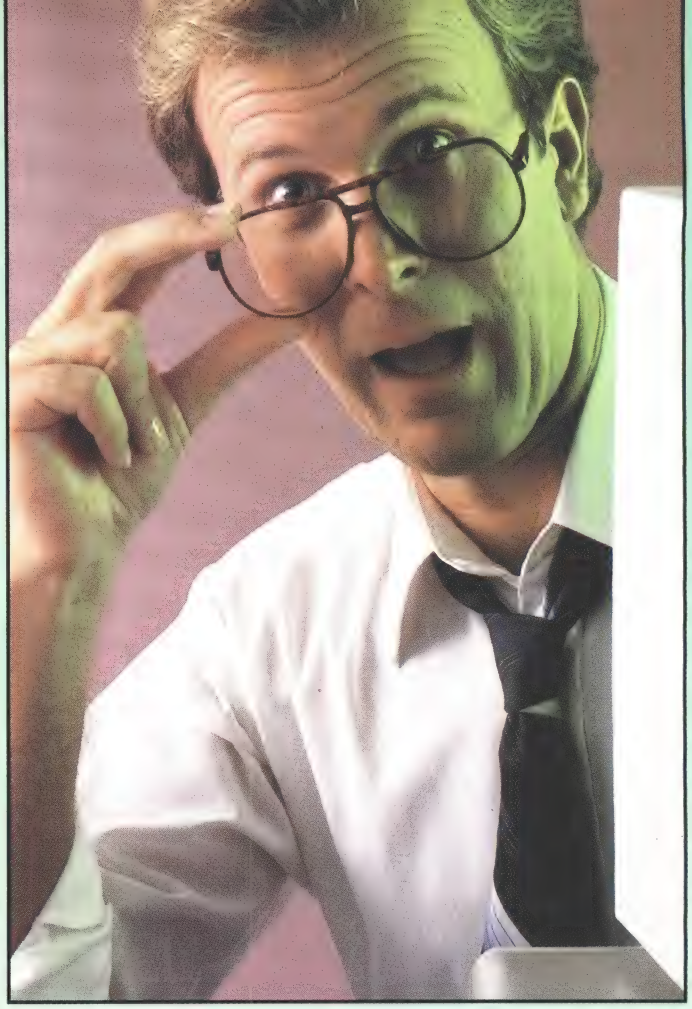

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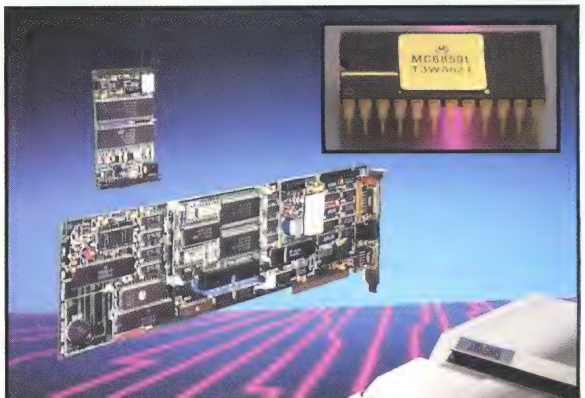

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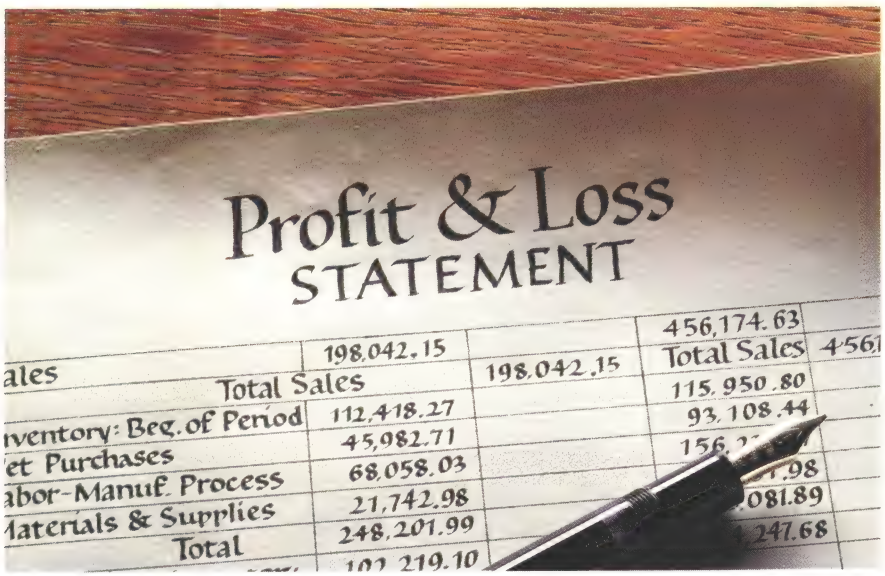

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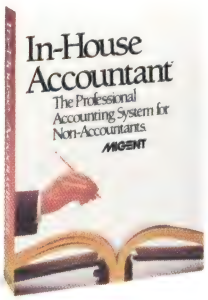

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Circle 372 on reader service card

According to QMS, it was necessary to be selective about the functions the KISS would support to price it under $2000. You can use the ANSI mode, but QMS does not provide documentation or technical support. By the way, a peek behind the covered font cartridge slot reveals a connector for font cartridges, but the KISS contains no programming to support them. –Ed.

Silicon-Based Life-Forms

After reading "Junior Partners" [*PCW*, November 1986], I'd like to share my own close encounter with a whiz kid.

The hospital where I work has a fellowship program for high school students. I asked for a student to do research and organize data for a drug information program I planned to write.

When the student arrived, I explained my research needs, and he said, "Well, I know how to program in Fortran, BASIC, and COBOL, but I understand your system uses MUMPS. I don't know the language, but I'd like to give it a try." Not only did the whiz kid finish my program, he went on to write a line editor program, an inventory control system, a drug ordering and monthly expense report program, and a journal reference data base as well.

The amount of time and money this kid has saved the clinic in

(continues)

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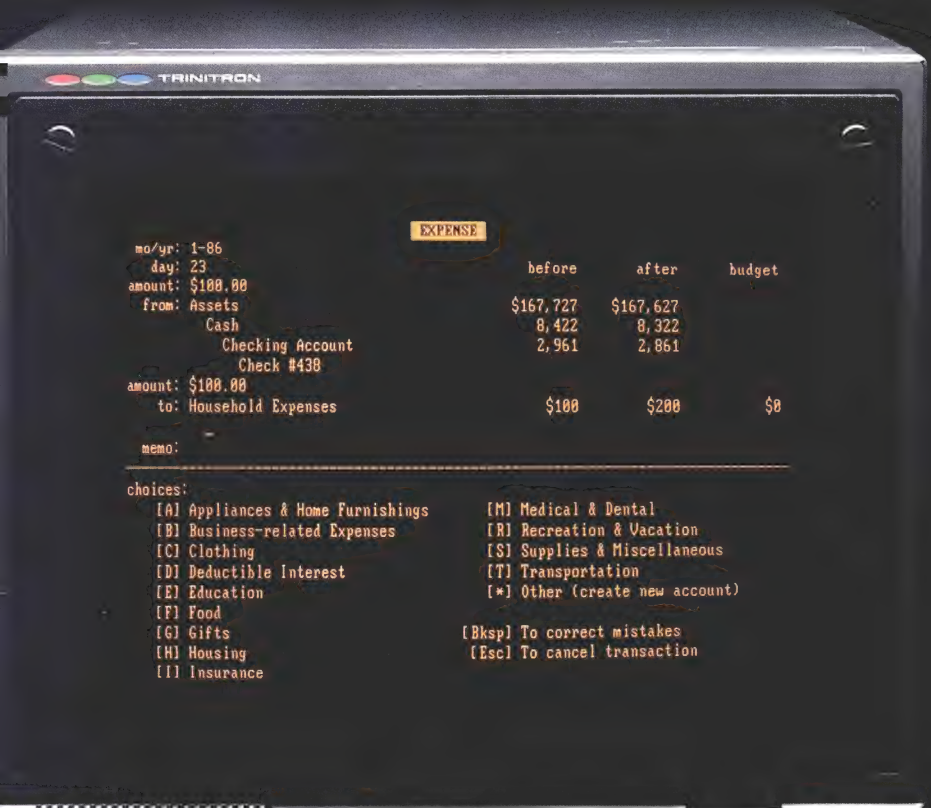

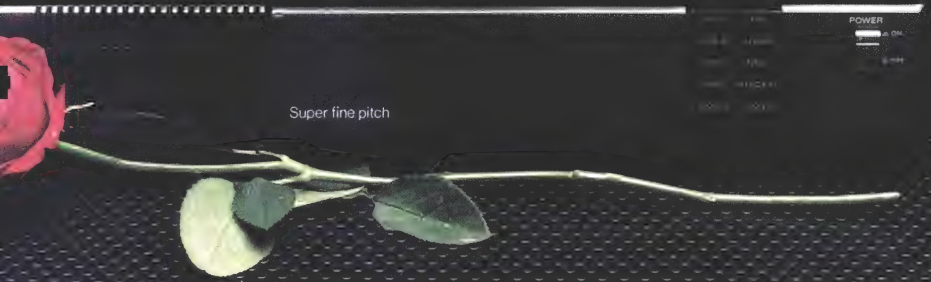

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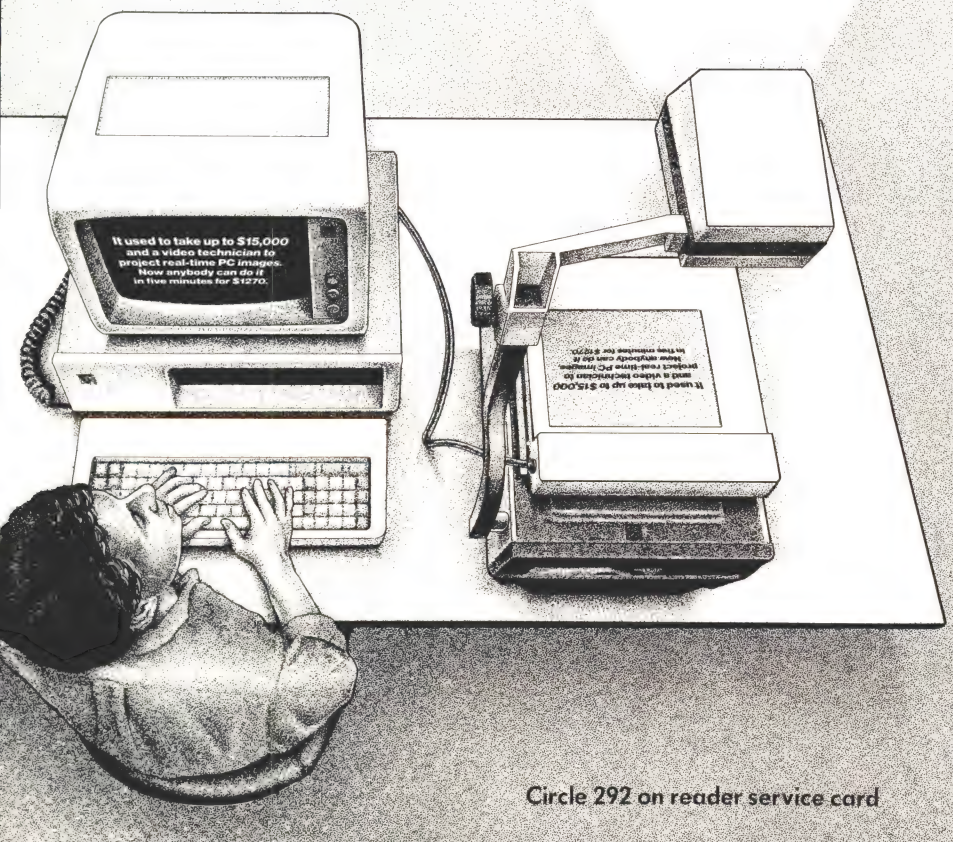

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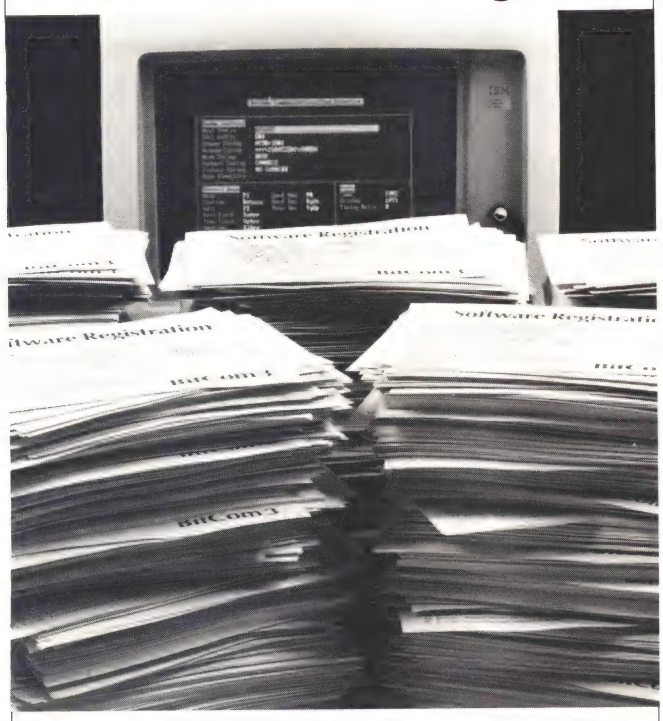

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terms of audits and inventory control alone is beyond calculation. The moral of this story: Keep your office doors open to the whiz kids.

Tom Davis
Bend, Oregon

AST on the RAMpage

I have long relied on *PC World* as a source of accurate information—often a rare commodity in the PC publishing industry. It was therefore doubly distressing to see what I believe is a serious error in the article "Accelerate!" [*PCW*, November 1986].

Regarding AST's RAMpage board and Classic Technology's 286 Speed Pak, author Robert Nusbaum states: "If you've filled out your system memory to 640K or, worse still, paid a premium for an enhanced expanded memory specification (EEMS) board such as the RAMpage, your investment is useless. When you own a 286 Speed Pak, breaking the 640K barrier means buying an EMS board such as Intel's AboveBoard."

While it may be true that the RAMpage can no longer page directly into conventional memory (the enhancement to the LIM EMS) when used with the 286 Speed Pak, it can be configured to emulate the AboveBoard.

According to Classic Technology, many of their customers run

(continues)

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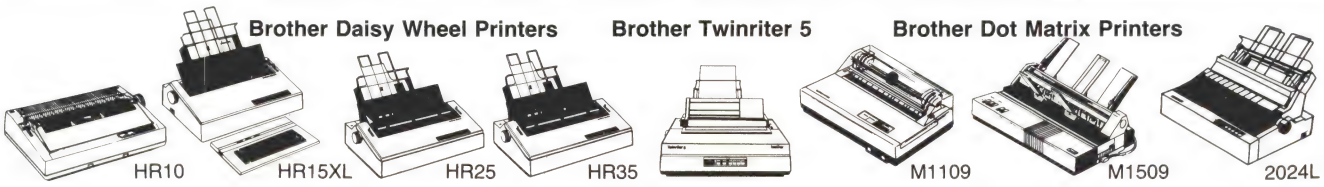

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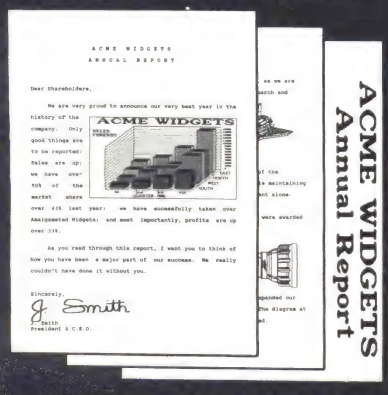

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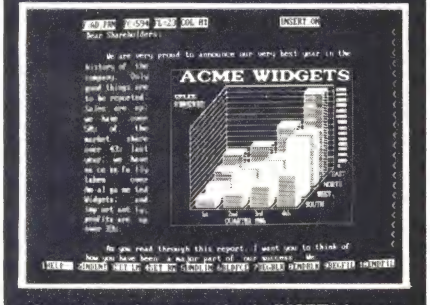

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the RAMpage board with the 286 Speed Pak and have no problems.

Does Mr. Nusbaum know something that Classic Technology and I don't?

Richard Rohlf
Product Marketing Specialist
AST Research, Inc.
Irvine, California

Thanks for the correction. During the course of our final edit on the article, Classic Technology informed us that the RAMpage would not work with the Speed Pak under any circumstances. We didn't press the point, but obviously we should have. –Ed.

Stale Chips

I'd like to correct some misinformation about rejected chips in David Needles' article on no-name IBM compatibles ["Better Than Big Blue?" *PCW*, November 1986]. Mr. Needles quotes consultant Barry Dobyns as saying, "Companies buy them by the barrel from Intel, which otherwise discards chips that fail reliability tests."

Intel goes to great lengths to ensure that all of its rejected or substandard products are destroyed and do not find their way to the market. Intel does not sell rejected products to anyone, and I'm sure that the other reputable semiconductor manufacturers are just as responsible as we are in this regard.

Gerry Euley
Corporate Reclamation
Intel Corporation
Santa Clara, California

I may have been in error when I made that statement. I've been assured by Intel that their rejected chips never get beyond their doors. While other reputable manufacturers may take the same precautions, in the Far East you can buy a 50-gallon barrel full of rejected chips. The fact that I've bought them in the United States means that someone *out there doesn't follow Intel's example. I still stand by my original contention that the possibility of finding such a chip in products from manufacturers primarily concerned with cutting costs is very high. –Barry Dobyns*

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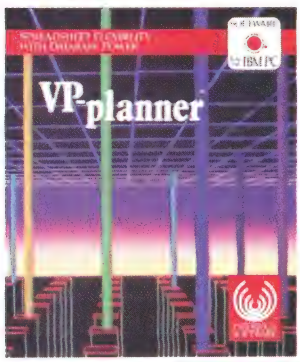
The Tale of the Emperor's Spreadsheet

You can't hide the truth. The emperor's tailors want you to think their expensive software is the finest money can buy. But before you expose yourself, take a closer look at the bottom line on *VP-Planner.*

VP-Planner is a spreadsheet program that is keystroke-, file-, and macro-compatible with the emperor's spreadsheet . . . yet costs only one fifth as much. Compatibility means you can use existing templates, tutorials, and training materials. Plus *VP-Planner* covers a lot of areas that the emperor's tailors ignored.

See for yourself.
The best does cost less.
$99.95



For example, *VP-Planner* has a seamless and flexible connection with external database files. This allows you to manage larger worksheet tasks in less time, using less disk space. And the unique Multidimensional Database™ feature eliminates tedious worksheet linking.

A handy Autokey™ feature lets you capture keystrokes and turn them into macros . . . and much, much more. Non-copy-protected backup disk and corporate licenses available.

VP-Planner.®
A GREAT DEAL more.

Software for the IBM®PC from Paperback Software.
2830 Ninth Street, Berkeley, California 94710 Phone (415) 644-2116

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Circle 229 on reader service card

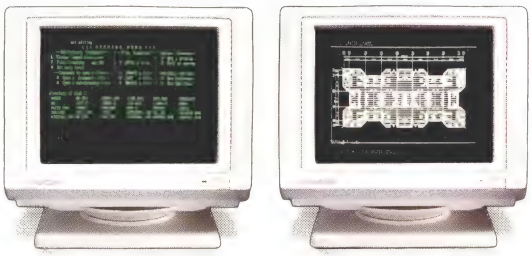
Amdek's new flat screen monitor won't leave you flat broke.

The latest in monitor technology is the flat screen. And, naturally, one of the first manufacturers to use this technology is the leading independent supplier of monitors—Amdek.

Our new flat surface monitor features a 12″ screen with dynamic focusing capabilities. And because Amdek doesn't cut corners, the 410 will provide you with consistent resolution from corner to corner. That means text will be crisp and clear no matter if it's displayed in the far upper right portion of the screen, or precisely in the middle.

What's more, depending on the software, the 410 can display up to 132 columns by 25 lines of text, giving you increased spreadsheet capability. Plus, you can choose a green, amber or white CRT—whichever is most pleasing to your eyes. A non-glare nylon mesh screen adds to easy-viewing, high-contrast display. And the attractive cabinet styling is aesthetically compatible with the IBM PC—and will actually complement any office setting. In addition, the unusually small footprint saves valuable desk space.

The Price? It won't leave you flat broke. Because the flat surface screen 410 costs less than IBM monitors. Plus Amdek's exceptional warranty makes sure that you won't be flat out of luck. It's three full years on the CRT, and two years on all other parts and labor. Our flat surface screen 410 works perfectly with the IBM XT and AT personal computers, as well as their compatible clones. So, it's the ideal monitor for many business and educational applications. With its styling, features and price, the 410 is flatly the best bargain in monitors today.



AMDEK

Clearly the finest in monitors.

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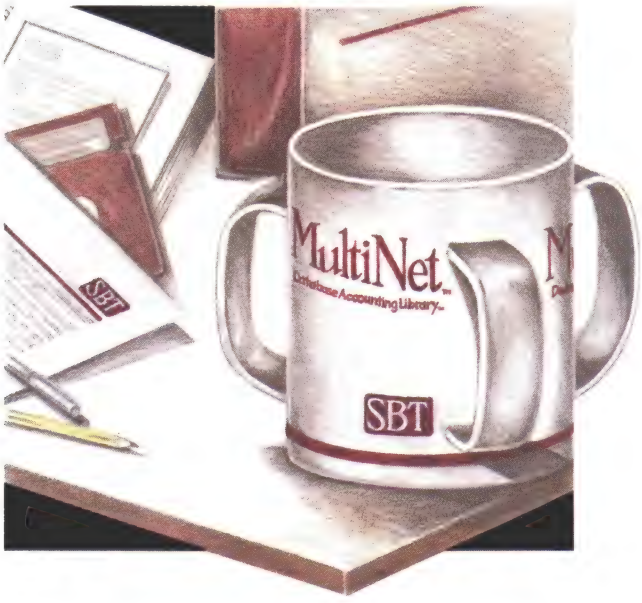
Circle 204 on reader service card

Get a new handle on your business with SBT.



Now you can handle up to 254 users, all working in the same data files, with the SBT MultiNet Database Accounting Library. The accounting software written in dBASE III PLUS.

So whether your business is large or small, you can grow to the limits of the most advanced PC networks available.

When you want that special report, or your business needs something we didn't think of, you can quickly and easily modify our programs to meet your needs exactly (because our dBASE source code is included **absolutely free**).

And if you don't have time to make the changes yourself, there's a nearby consultant who can make them for you.

So if your company has two users or two hundred and fifty, you can add customers, update records, and have as many people enter orders as it takes to keep your business growing.

Isn't it nice to know there's software you can't outgrow? The SBT MultiNet Database Accounting Library.

Now you can get a new handle on your business.

Call today for our demo disk and brochure.

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dOrder	Sales Order processing	$295
dInvoice	Billing/Inventory Control	$295
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dPurchase	Purchase Order	$295
dPayable	Accounts Payable	$395
dPayroll	Payroll/Labor	$395
dLedger	General Ledger/Finance	$395
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dProject	Project/Job Accounting	$395
dProperty	Tenant/Unit Management	$395
dBackup	Menu/Backup	$ 65

MultiNet versions $200 additional per module

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Circle 431 on reader service card

Harry Miller

Executive Privilege

PC World introduces the Executive Summary: a concise evaluation of a product's specific tasks and functions, designed to aid your purchase decisions.

Each month in these pages, *PC World*'s editors convey their best judgments about the most appropriate and useful hardware and software products available. As always, our reviews concentrate on how a product can increase productivity in the workplace and how well a product's design matches its intended application. Our goal is to help you make an informed purchase decision—one that will repay the investment of time and effort that you make whenever you introduce a new product into the work environment.

Starting with this issue you'll find a new feature in our product review articles that specifically addresses your need for clear, concise information on product performance and value. The *Executive Summary* states what we've found to be a product's best and worst features, providing you with quick access to comparative highlights of the in-depth, application-minded evaluations that are the hallmark of our reviews. These summaries rate a product on how well it performs its essential tasks or functions as compared with other products in the same category. Each product category has its own set of criteria—essential tasks and functions—that make the difference between a merely adequate product and one that truly fits the way you work. For each product category we focus on the

Executive Summary

These summary boxes reflect *PC World*'s comparative evaluation of a product according to its specific tasks and functions. While the summaries are easily accessible, most readers will need to refer to the main text of the article for the kind of in-depth information that can guide a purchase decision.

Information accessibility	*Excellent*
Subjectivity	*Good*
Appropriateness for purchase decision	*Excellent*
Overall value	*Excellent*

(continues)

Now There's A Management Tool That Lets You Work More Efficiently... Without Changing The Way You Work. Lotus Metro.

Lotus® Metro™ is a memory-resident program that combines the powerful efficiency of 12 business management tools with the time-saving convenience of macros.

Metro gives you more ways to get your work done. Metro has the same command and menu structures as 1-2-3® or Symphony® so you already know how to use it. And since it's from Lotus, you can count on its high quality and reliability to let you start working more efficiently—and in complete confidence—right away.

In fact, when you consider everything Metro can do, you won't believe its low price—just $85.

The Most Comprehensive Product Of Its Kind.

Metro lets you handle daily tasks on your PC more quickly and easily than ever before. You'll simplify routine—and complicated—jobs. Handle workflow interruptions more effectively. Organize your day.

In short, you'll become more productive by minimizing the time you waste.

Bring All Your Work Together.

You can customize Metro to your needs by choosing any of the following management tools:

- *Clipboard* lets you easily move data and text between 1-2-3, Symphony or other software products—as well as between the Metro management tools themselves.
- *Appointment book* keeps track of your schedule.
- *Phone book* compiles names, addresses and phone numbers—and can even dial your phone.
- *Calculator* includes memory and financial functions.
- *Notepad* lets you jot down quick ideas and memory-joggers you can retrieve at the touch of a button.
- *Editor* creates business letters and spreadsheet reports, and allows you to view and edit existing files.
- *List manager* orders daily tasks, and effectively segments/tracks "to do" lists.
- *Watch* helps you keep records of time spent on as many as 100 different projects.
- *DOS file manager* executes DOS commands from within applications.
- *Kaleidoscope* specifies colors on your screen, *Configuration* lets you build the product that best fits the way you work, *Special characters* contain a full 256 character IBM extended ASCII table.
- And *Macros* let you turn even your most complicated multi-step tasks into one-step commands.

High Quality... Total Compatibility.

Metro is built to the high quality standards of 1-2-3 and Symphony—so it won't endanger your data. Metro is unprotected, so it's easy to install and easy to use. And it can be easily removed from memory whenever you need more room for your spreadsheet or other functions.

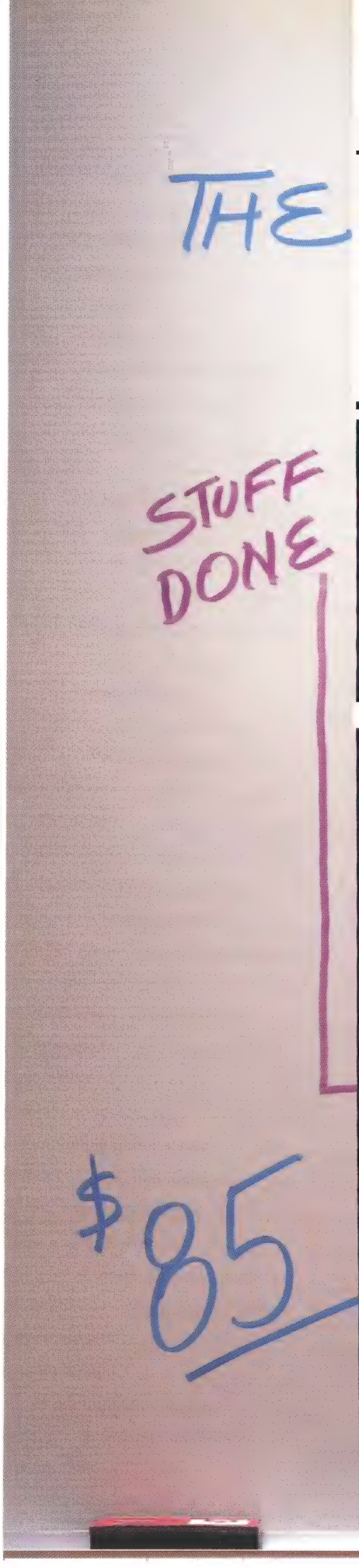
As a member of the Lotus family, Metro is the management program best suited—and designed—to work with other Lotus products. And it comes complete with Lotus' unparalleled commitment to customer service, reliability and support.

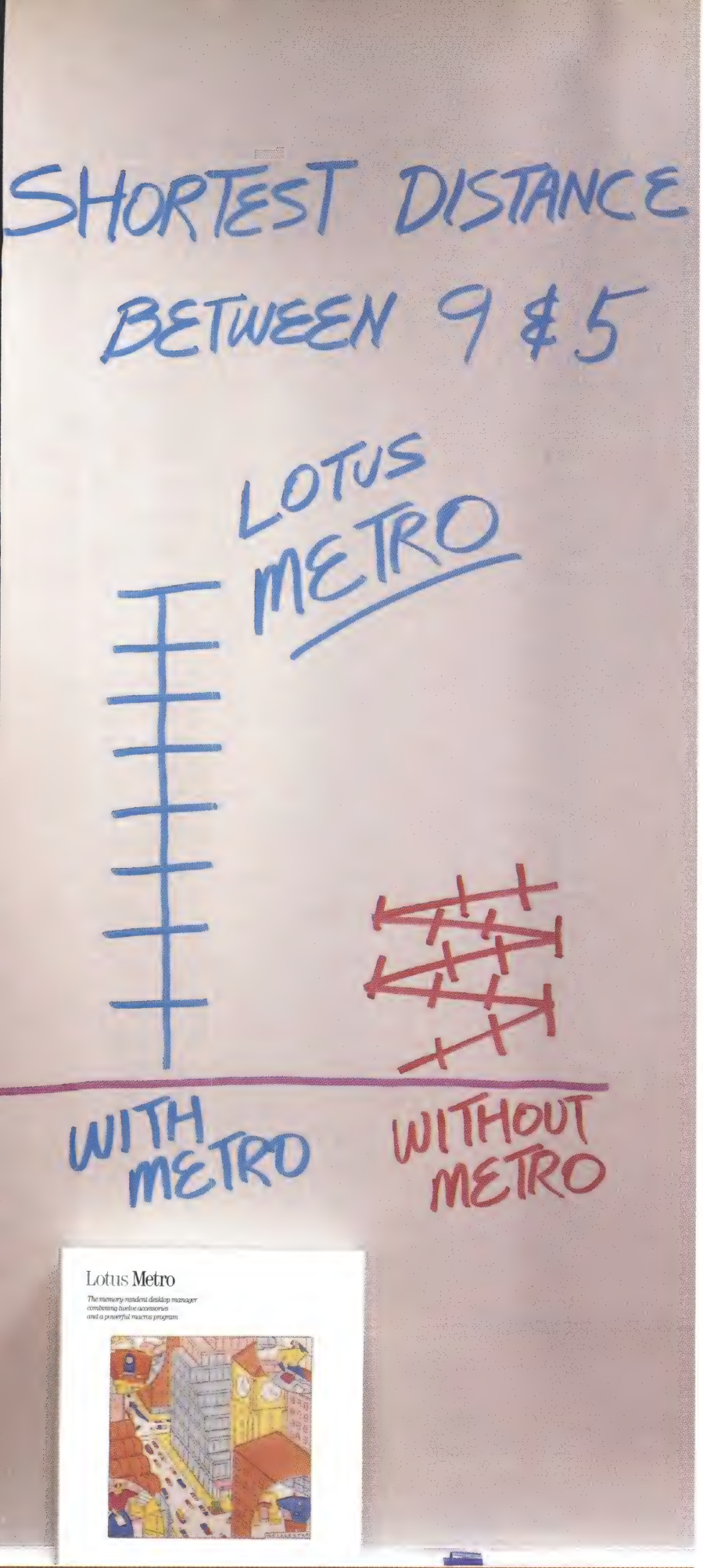
© 1987 Lotus Development Corporation. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. Metro is a trademark of Lotus Development Corporation.

System Requirements:

IBM® PC, XT, Portable, AT, COMPAQ® Portable, PLUS, DESKPRO. Two 5.25" double-sided disk drives (hard disk recommended for optimal performance). Minimum of 80K required for RAM-resident portion of Metro. DOS 2.0 or higher. Metro is unprotected and can be removed from memory.

Lotus Metro runs with a wide variey of software programs, including 1-2-3® Symphony,® Symphony Spelling Checker, Symphony Text Outliner, 1-2-3 Report Writer,™ and Signal.™





Try Lotus Metro Today.

No other "desktop" product offers you the power and efficiency of Metro...

The unique combination of comprehensive management tools and macros that allows you to manage your PC... organize your workday...and increase your productivity.

And, at only $85, no other product even comes close to its value. (Especially since Metro will quickly pay for itself again and again.)

Which is why you should visit your nearest Lotus dealer to sample Metro.

Or, if you're already convinced, simply use the coupon below to order Metro directly from Lotus.

Or order Metro (Product No. PM-1690) by calling Lotus, toll free,

1-800-345-1043

Lotus Metro

The memory-resident desktop manager combining twelve accessories and a powerful macros program.

Complete and return to: Lotus Development Corporation, 90 Annex, Atlanta, Georgia, 30390-0370 or call 1-800-345-1043.

☐ Yes. I'd like to try Lotus Metro for 30 days without obligation. (PM-1690)

☐ Please send more information about Lotus Metro. (PM-2821)

Send me____unit(s) of Metro @ $85 each_____

Sales Tax** . . . . . _____

Total . . . . . _____

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Please charge my: ☐ VISA ☐ MasterCard

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Expiration Date_____/_____

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**Residents of the following states apply applicable sales tax: CA, DE, FL, GA, IL, MA, MD, MI, MN, MO, NJ, NY, OH, TX, VA, WA. Offer good in U.S.A. and Canada only. In Canada make payment by credit card or International Postal Money Order. CODs and purchase orders will not be accepted.

When you purchase Metro directly from Lotus, take your first 30 days to try it out. If, at the end of your first month, Metro does not perform as described and you've purchased it directly from Lotus, we'll gladly give you a full refund.

FoxBASE wins the dBASE race!

6.43 times faster than dBASE III PLUS

New FoxBASE+ sweeps the field: runs 2.26 times faster than Clipper, 6.69 times faster than dBCOMPILER, and 10.86 times faster than dBMAN! And FoxBASE compiles programs up to 60 times faster than other compilers.

The others aren't even close!

New FoxBASE+ is totally compatible with dBASE III PLUS as is original FoxBASE with dBASE II. No changes in your present programs, databases, screens, or reports!

Though FoxBASE is a super-fast compiler, it offers the familiar, user-friendly interactive features of dBASE and the full power of "dot prompt" mode *plus* many significant enhancements.

Best of all, FoxBASE is economical. Single-user FoxBASE costs just $395, multi-user FoxBASE $595**—no matter how many workstations you have.

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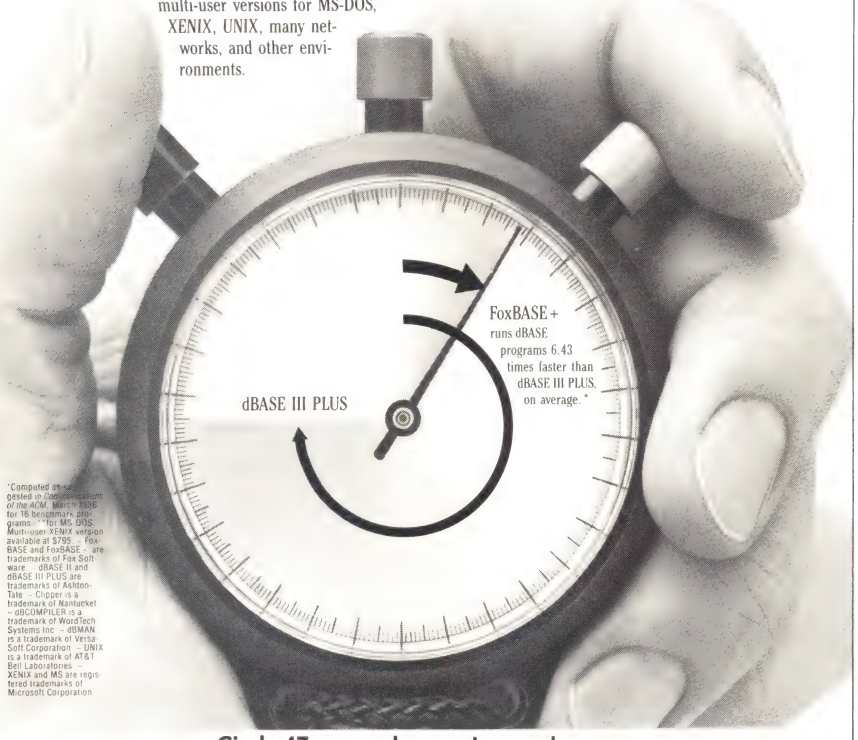
FoxBASE is available in single and multi-user versions for MS-DOS, XENIX, UNIX, many networks, and other environments.



*Computed as suggested in Communications of the ACM, March 1986 for 16 benchmark programs. **for MS-DOS. Multi-user XENIX version available at $795. — FoxBASE and FoxBASE+ are trademarks of Fox Software. — dBASE II and dBASE III PLUS are trademarks of Ashton-Tate. — Clipper is a trademark of Nantucket. — dBCOMPILER is a trademark of WordTech Systems Inc. — dBMAN is a trademark of Versa Soft Corporation. — UNIX is a trademark of AT&T Bell Laboratories. — XENIX and MS are registered trademarks of Microsoft Corporation.

Circle 47 on reader service card

PC World Creates a Long Buy-Line for You

Queue up! *PC World* readers mean big business—for you. Call your Account Manager to reserve your advertising space today—please see page 4 for phone numbers.

factors that most affect a product's usefulness under everyday working conditions.

We think this approach is particularly important since it mirrors the normal product selection process. While a few products may be chosen for their overall quality, most purchase decisions are rooted in a specific task or function that a user must perform and that a given product does especially well. A data management program will be selected for its reporting flexibility or its sorting and indexing speed, depending on the user's need; a laser printer's embedded page description language or its reliability may likewise be the deciding factor.

We rate a product's performance of each function relative to the way all other similar products in its category perform. For example, a desktop publishing program's text editing capabilities are matched against the best editing functions found in any such program. Similarly, a given dot matrix printer's resolution and print quality are matched against all other dot matrix printers.

Of course, there's more to a purchase decision than the sum of a product's performance ratings. The ratings for each function also reflect ease of learning, ease of installation, and error handling. The price of the product and the manufacturer's support come into play as well. We combine those latter factors with the performance ratings to establish a rating for "overall value."

We hope you'll find that this new service will enhance *PC World*'s overall value to you.

"Frankly, online computing costs were real ugly..."

$10.00+ per hour

Most online information networks can zap your computing budget faster than you can say "lightning." Not so with GEnie, the General Electric Network for Information Exchange. As part of the world's largest commercially available teleprocessing network of General Electric Information Services Company, GEnie lets you experiment with all of the fun and excitement that online computing has to offer.

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With GEnie's IBM† ***RoundTable***™ ***Special Interest Group*** you can discuss the latest in IBM PC products and accessories; download thousands of public domain software programs, and participate in exciting and informative online conferences. And, UPLOADS ARE FREE on GEnie!

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Meet friends old and new with GEnie's ***LiveWire***™ ***CB Simulator*** or exchange messages with GEnie's ***electronic mail*** service. Schedule a trip with ***American Airlines travel service.*** Fun and learning for the whole family with ***Grolier's electronic encyclopedia.*** Play classic and ***multiplayer games.*** Track stock market quotes, check market indicators and maintain an automatically updated personal portfolio online with GEnie's ***Financial Services.*** All this and there's more to come. New services are being added each and every month!

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									300 baud	*1200 baud*
The Source	X	X	X	X	X	X	$49.95	$10.00	$8.40	$10.80
CompuServe	X	X	X	X	X	X	$39.95	none	$6.00	$12.50
GEnie†	**X**	**X**	**X**	**X**	**X**	**X**	**$18.00**	**none**	**$5.00**	**$5.00**

**Basic rates and services shown in effect 11/86. †Non-prime time applies Mon.–Fri., 6pm–8am local time, all day Sat., Sun., and nat'l holidays. Subject to service availability. Additional charges apply for 2400 baud and financial services.*

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1. Have your Visa, MasterCard or checking account number ready.
2. Set your modem for local echo (half duplex)—300 or 1200 baud.
3. Dial **1-800-638-8369.** When connected, enter HHH
4. At the U# = prompt enter **XJM11897,GEnie** then RETURN.

Need help or more information? No modem yet? We can help. In U.S. or Canada call **1-800-638-9636.**

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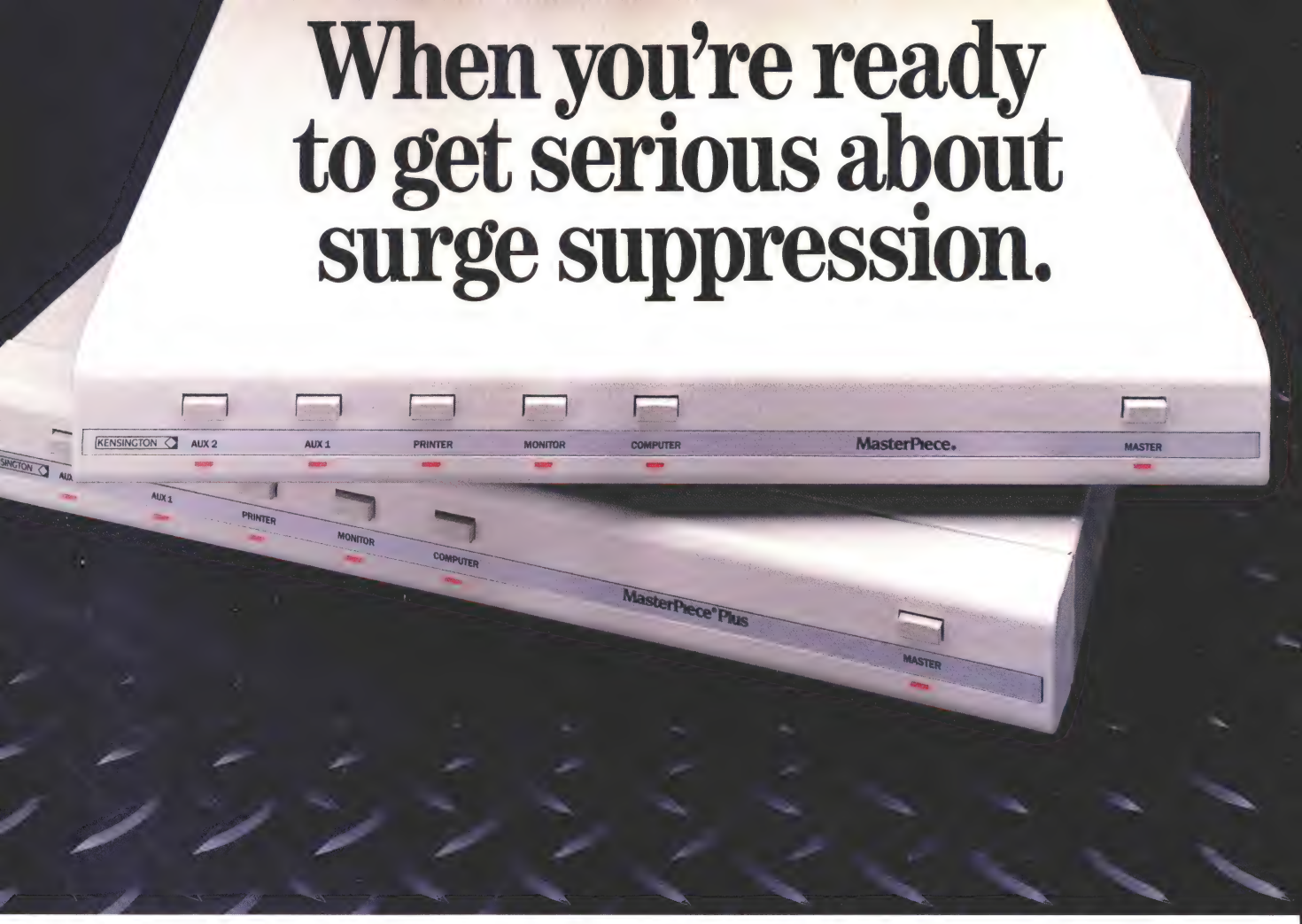
When you're ready to get serious about surge suppression.



Here's important advice for PC users. With test after test proving that 70-90% of all PC malfunctions can be traced to disturbances in the power supply, a surge suppressor is the first accessory you should buy for your PC.

But don't put your trust in just any surge suppressor. Get one that gives your whole system superior protection. One that's engineered to the highest specifications.

Get a Kensington Master Piece or Master Piece Plus. Computer dealers will tell you they're the most popular PC surge suppressors. And the most serious. Because at Kensington, we're dedicated to giving your PC the best possible protection.

That's why Master Piece contains a unique two-stage surge suppression circuit incorporating a high-speed silicon semiconductor for the quick reaction necessary and a heavy-duty metal oxide varistor for the brute force required to keep even the largest surges from penetrating into your system.

	Master Piece and Master Piece Plus
Meets IEEE 587-1980 Category A	✓
Meets IEEE 587-1980 Category B	✓
UL Listed	✓

The right surge suppressor passes all the tests.

And that's why Master Piece Plus is the communications user's dream-come-true. Its additional circuitry smoothes surges, spikes and noise on the telephone line, protecting your modem and increasing the reliability of your data communications.

The circuitry in both Master Piece and Master Piece Plus is designed to exceed Category A of IEEE* specification 587-1980, as well as those established by UL†.

Sound good? Keep reading, it gets even better. Our circuitry also exceeds Category B of IEEE specification 587-1980. Under this category, created to guard against the severe spikes near the main power distribution panel of a building, Master Piece will even protect your PC from a simulated 6,000 volt lightning strike with a 3,000 amp follow-on current.

Now, this may look to you like we're taking more than the necessary precautions. And actually, we are. But after all, isn't that what you expect from the best?

Master Piece ($149.95) and Master Piece Plus ($179.95). For the dealer nearest you, or to speak to a Kensington sales representative, call (800) 535-4242.
In NY (212) 475-5200.

KENSINGTON™

*The Institute of Electrical and Electronics Engineers. †Underwriters Laboratory. Master Piece and Master Piece Plus are UL Listed. © 1986 Kensington Microware Ltd.

Circle 474 on reader service card

Knowledge is Pure Power

Lightning and other electrical disturbances can cause major damage to computer equipment and data. Protection from these conditions is one important reason to know about PurePowerPlus. But there's another reason why PurePowerPlus is worth knowing about. In addition to providing the best in EMI/RFI filtration and optional modem line protection, no other surge protector monitors the heavy power demands of equipment such as laser printers and plotters.

Keep yourself well-informed

PurePowerPlus is the only system that informs you of your equipment's current and voltage status on easy-to-read indi-

cators. It lets you know if you're encountering conditions such as brownouts or overcurrent that are dangerous to the well-being of your data. Of course, this knowledge is the real power of PurePowerPlus: You can take preventative action to avoid any power and data loss. What's more, only PurePowerPlus automatically shows you the status of the unit after it's handled a major electrical surge.

Features	Models			
	PurePower	**PurePower II**	**PurePowerPlus**	**PurePowerPlus II**
Master Switch	✓	✓	✓	✓
6 Outlets/Switches	✓	✓	✓	✓
EMI/RFI Filtration	✓	✓	✓	✓
Swivel Base	✓	✓	✓	✓
Static Discharge	✓	✓	✓	✓
Voltage Indicator			✓	✓
Current Indicator			✓	✓
Modem Surge Protection		✓		✓
List Price	$139.95	$169.95	$189.95	$199.95

Pure convenience

Organize peripheral power cords and plug them all into PurePowerPlus' convenient back panel sockets. Control an entire computer system with one master

switch—or turn peripherals on and off independently. And touch the front panel anywhere to dissipate static charge during dry weather. It's all pure and simple with PurePowerPlus, including adjusting your monitor to a comfortable viewing angle with the handy swivel base. PurePowerPlus is manufactured in the U.S. and works with any PC system.

Discover how knowledge is PurePower

To order PurePowerPlus, call or write SSB Design, 17971-G Sky Park Circle, Irvine, CA 92714 (714) 261-6855, Fax: (714) 261-2837.

SSB Design

Circle 451 on reader service card

using a
op Publisher,
a well be
xwards."

Leonardo da Vinci

You got our message, didn't you? And that's the point. Powerful graphics (such as our big backwards headline) not only capture your reader's attention, but get your ideas across with maximum impact.

Producing documents that combine telling graphics with compelling words is the genius of Xerox Desktop Publishing. You design your document on a Xerox workstation, putting words and graphics together to form the document that will convince your audience, sell your product, make your point. When your document appears on the screen exactly the way you want it, send it to a Xerox laser printer and watch it printed out laser-perfect.

Xerox Desktop Publishing is ready to go to work for you right now. No matter what your particular needs.

If you need a system that can stand on its own or be connected to a

XEROX

"If you're not Xerox Desk you might a writing bac

network, there's the Xerox Documenter. If you own an IBM PC XT/AT or compatible, then our Xerox Ventura Publisher Edition software is tailor-made for you. If you need an MS-DOS-based stand-alone, we'll set you up with a Xerox Desktop Publishing System.

TeamXerox

And when your needs expand, Xerox can grow with them, because our Desktop Publishing components are part of a migration path which can include local area networks as well as a complete line of electronic publishing systems and laser printers. So, whether you're starting from scratch or adding to existing hardware, you can start creating documents that truly reflect the genius in you.

Xerox brings out the genius in you.

Circle 56 on reader service card

Xerox Corporation, P.O. Box 24, Rochester, NY 14692.
☐ Please have a sales representative contact me.
Please send information on ☐ The Xerox Documenter.
☐ Xerox Ventura Publisher Software.
☐ Xerox Desktop Publishing System.

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PC WORLD

Fishing for Words

Quick now: What's another term for "self-made software marvel"?

"If people think something ought to happen, they should just make up their minds to do it."

That's the gospel according to Mike Weiner, president and founder of Microlytics, a two-year-old company that developed and markets the *Word Finder* online thesaurus and several spelling checkers.

A Brooklyn-born college dropout and printer, the 39-year-old Weiner moved to Fort Pierce, Florida, in the early seventies to work as an independent commercial fisherman. Two years into the venture, he organized a fishermen's association to combat a pricing monopoly set by fish wholesalers.

As the association pursued its ultimately successful antitrust suit against the wholesalers, Weiner actively sought press attention via letter-writing campaigns and feature articles. In the process, he discovered high-speed copiers.

"I fell in love with Xerox copiers," he says simply. "I'd been a fisherman for 5½ years straight and had loved it for four." Weiner decided to apply for a job at Xerox.

Xerox responded coolly to a fisherman with no college degree. Weiner initiated a six-month campaign of phone calls, letters, and requests for interviews. He finally secured an interview with this pitch: "I get up at 4 o'clock every morning, and I don't have to. I go out there and pull fish out of the ocean. Volition—I have volition!"

Xerox took the bait. Over the next decade, Weiner became what he calls a "Xerox person," rising from sales rep to manager of compensation planning at Xerox's marketing headquarters in Rochester. Finding few palm trees and ocean breezes in upstate New York, he coped with, and overcame, culture shock.

Working 60-hour weeks, Weiner continued to nurture his avocations, with Xerox's blessing. In 1976 he wrote and self-published *The Commercial Fisherman's Guide to Getting a Loan.* The next year, he and his wife started a company called Wreck Charts, selling diagrams that pinpointed shipwreck locations in United States coastal waters.

In 1983, he launched Writing Consultants, a mail-order business established to promote his second self-published book, *Proportional Spacing on WordStar,* and a program Weiner developed called *ProportionalStar.* Writing Consultants is now a division of Weiner's latest company, the East Rochester-based Microlytics, founded in 1985 with financial backing from Xerox and other investors.

Word Finder was the first Microlytics product to hit the streets. Weiner maintains that its data base of 220,000 synonyms is more than three times bigger than that of any competitor. "I felt we had a good shot as a product, and that a thesaurus could become essential to a word processor," explains Weiner. Fans responded fervently: "Your *Word Finder* has changed my life!" raved William F. Buckley, Jr.

Microlytics sells *Word Finder* and licenses its thesaurus technol-

PC World View *reports items of interest to computer enthusiasts and significant insights about industry trends and personalities.* —*Eric Bender*

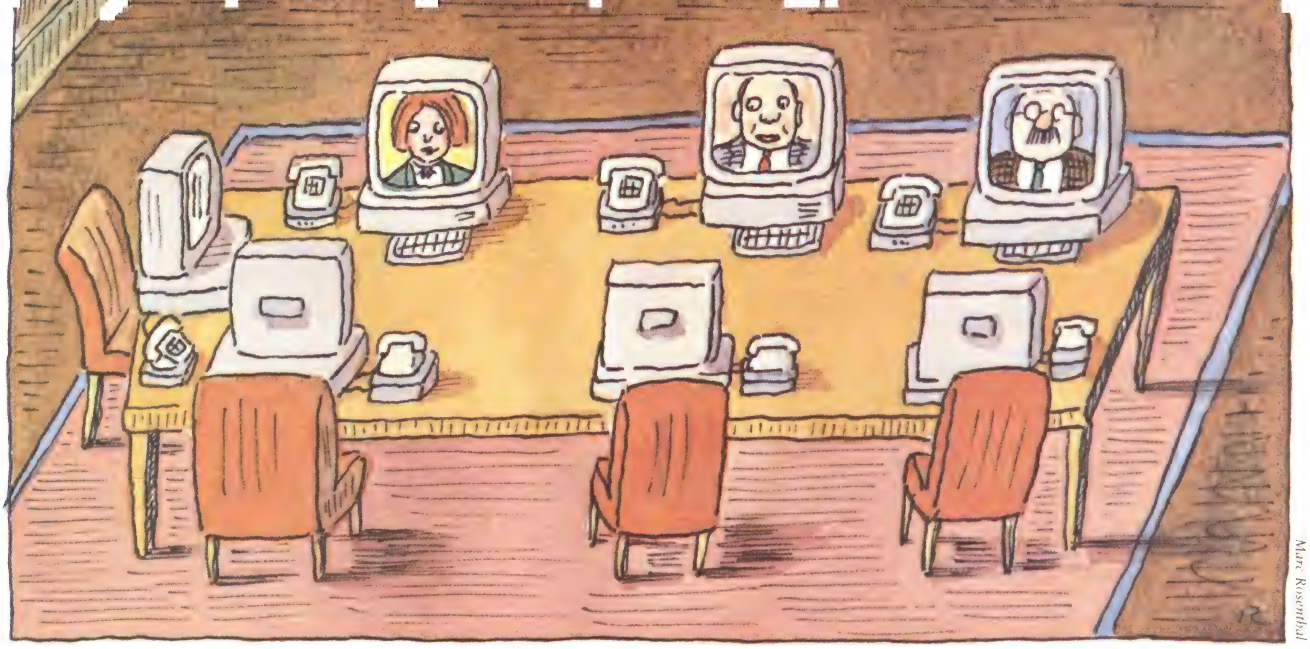
ogy to Microsoft, MicroPro, Lifetree, Symantec, and others. "Licensing hurts our sales," Weiner readily admits, "but that's fine. Our strategy was to create a tremendous demand for the thesaurus as a product where no demand existed two years ago. We plan to wind up with a royalty stream from various word processor companies."

Other Microlytics products, sold through Xerox, include *Type Right,* a spelling checker for the Xerox Memorywriter, and PC Type Right, a spelling-checker device for the PC. The size of a modem, PC Type Right derives its power from the keyboard cable. (On the plus side, this means the product can support a 100,000-word dictionary without taking up any RAM; on the minus side, it can only beep at errors, not correct them.)

Weiner rarely goes fishing these days. But he's still in love with Xerox copiers; he even has one at home. *–Marina Hirsch*

Blake Little

Michael Weiner fished for a living, worked at Xerox, created one company that sold shipwreck charts, formed another start-up that marketed WordStar enhancements, and then founded Microlytics. His latest firm's Word Finder package, an on-line thesaurus now bundled in with many leading word processors, has helped thousands of PC users get the right word.



Marc Rosenthal

Video Visions

Old editions of *Popular Science* are crammed full of weird inventions that never quite made it off the drawing board: cars without wheels, personal gyrocopters, and video phones.

You remember video phones: AT&T first demonstrated them at the 1964 New York World's Fair. After spending more than 20 years and millions of dollars flogging the concept, the industry won't let video phones die—resolute public rejection notwithstanding.

While AT&T has limited its approach to connecting remote meeting rooms, Datapoint of San Antonio, Texas, is holding fast to the original idea. Datapoint, a computer supplier often described in the business press as "embattled" or "beleaguered," sells a voice/data/video terminal meant to bring full-action video right to the desktop. The Datapoint product family is based around the MINX (Multimedia Information Network Exchange) terminal.

The MINX replaces a conventional PC monitor and is said to be compatible with the EGA and the CGA. Conventional monitors don't, however, have the MINX's small camera lens peering out from their right flank.

Hooked into one of Datapoint's local area networks, the system permits executives scattered throughout a company to hold instantaneous "face-to-face" meetings. That capability pays big dividends in high-pressure business situations, the company claims.

Nonetheless, product manager Wally Balin says that a scant 150 terminals were sold during the product's first year, with an equal number installed as demonstration or pilot machines. "At the current price," he acknowledges, "this isn't a very large market. But as the price approaches the PC price—and it will—the market will bloom."

MINX monitors are not for the fiscally fainthearted, although a recent price cut brought the per-terminal fare down from $11,000-plus to $8900. Users also need a special digital modem on both ends of a network to swap pictures around. These currently run about $80,000 a copy.

"I can give away the MINX and still move relatively few units because of the modem price," Balin notes. "You need a specific application." On the other hand, he observes, "it's a much easier purchase to justify than a corporate Lear jet." And he expects digital modem pricing to fall dramatically in the next two to three years.

But skeptics remain. "I see no market developing for video services in the corporate environment," says Casey Dworkin, research director of Personal Technology Research in Boston. "It's a technology in search of a market. You're asking people to change the way they've worked all their lives."

Greg Carlsted, a telecommunications analyst with Dataquest in San Jose, feels that the MINX is too expensive, adding that that resistance to video telephony is cultural—and won't be overcome quickly. "Video does not substitute for having a warm body across the desk from you," Carlsted insists. —*Daniel J. Rosenbaum*

Knock-Your-Socks-Off Black Box

Forget those poky old PCs built around the Intel 80386, suggests Joe Maroney, and try something *fast.*

Maroney, general manager of Datavue Technical Systems, is hawking a machine claimed to chomp through PC software 15 times faster than a PC AT. Datavue's Advanced Personal Computer (variously known as the Super Micro/150 and the Series 180) looks just about like any other AT clone, except for the black box that sits underneath. Inside lurks an unusual proprietary processor that Maroney says operates just like an Intel 8086, but with a clock speed of 150 MHz. (You read right: *150* MHz, not 15.)

The secret to this haste is what Datavue calls "flow-through logic" architecture. Open up the box, and the Datavue Super Micro looks nothing like any PC. The CPU—dubbed the 86150—consists of two boards with hundreds of integrated circuits and dozens of PAL (Programmable Array Logic) components connected by a 32-bit bus.

This all hooks into the rest of the PC through an Intel processor or coprocessor slot. Despite these alternate realities, Datavue says, the Advanced Personal Computer is fully XT compatible. That's because Datavue developed its own XT-compatible single-board computer, dubbed the 8612. The 8612, in turn, serves as the front-end processor for the monster 86150.

The Super Micro achieves an average speed of 10 million instructions per second (MIPS), with peaks of 22 MIPS. While comparing MIPS measurements is always misleading, those figures lift the internal processing performance into the high-end mainframe arena, although the device is still stuck with standard PC input/output bottlenecks.

A more appropriate measure of performance is the Norton Index, which assigns the standard vanilla PC a rating of 1. The Datavue quickly zips its way to a 72 rating.

Datavue's current version is scheduled to ship this quarter, going to CAD/CAM diehards and other power addicts ready to cough up $12,000 and more.

Maroney first saw the requirement for such raw computing power many years back, when he worked in a petroleum refinery. There, he says, he watched huge quantities of oil being unceasingly pumped back and forth because there was no good way to calculate how mixtures could be optimized.

Today, Maroney has little trouble convincing people they need to harness such massive horsepower. Those who've paid Datavue a call include AT&T, ITT, and a few other major iron makers. *—E. B.*

Intelligent Move

As your mother may have told you, one of the clearest signs of higher intelligence is the willingness to sacrifice for others. Last fall, Intelligent Systems made just such a move, preparing to self-destruct for the greater good of its shareholders.

The Norcross, Georgia, firm had put together quite a portfolio of PC equipment suppliers, led by Quadram, whose entries sprawl across the PC add-on market. Also in the fold: Princeton Graphic Systems and Datavue Corporation.

But when Intelligent decided its shares were undervalued on Wall Street and it was time to break up, its constituents took the move in stride. Soon afterwards, Quadram president Bob Brown kicked off a round of product introductions by cheerfully hanging a "For Sale by Owner" sign around his neck. *—E. B.*

The Silver Bullet(in Board)

A cloud of dust, a speeding modem, and a hearty "copy protection—away!"

The voice was furtive, and the speaker may have been calling from a pay phone. Anonymity was assumed. The only name he'd give was already tinged with notoriety: the Lone Victor.

For those not privy to the legend, the Lone Victor is a copy protection artist. More accurately, he breaks protection schemes on name brand software like *1-2-3* and *Wordstar 2000*. And he doesn't stop there. A Robin Hood with a debugger, he ensures that the rest of the world knows exactly how to pick the lock as well.

"Copy protection is such a pain," grouses the Victor. "I simply refuse to have any type of copy protection scheme on my machines." Ever since he lost a copy of *dBASE III* he was trying to uninstall from a hard disk, the Lone Victor has taken revenge with such doggedness that he's become a symbol of disgruntlement with copy protection. For the past two years, he's cracked every version of Softguard Systems' popular copy protection scheme, a routine designed to keep folks from reproducing *1-2-3, DoubleDOS,* and other programs. Before Ashton-Tate changed its ways, that scheme lurked on *dBASE III* and *Framework* disks. The Victor also triumphed over early releases of Prolok, the protection method that originally required users to pop in a custom floppy with a laser-bored hole.

Cracking Prolok was no picnic. "It took a few days of work," the Lone Victor admits, but he adds that it was the first scheme he shattered.

By contrast, breaking Softguard was a breeze. It now takes the Victor just a matter of hours to unravel each new permutation of the program. "But Softguard doesn't change it that much," he notes. He regularly uploads his results to the Atlanta IBM PC User Group Bulletin Board. From there the files travel from BBS to BBS across the country.

And the nature of these files? Not programs, but debugging scripts—directions on how to attack a piece of software with the DOS debugger, trace its tussle with encryption code, and write to disk a version cleansed of copy protection.

Written with a blend of defiance and panache, the scripts have attracted a wide following. They explain in one breath how copy protection is a violation of a user's rights under copyright law, and in the next—what to put in the CX register. They always conclude with a command to display—"for grins," as the scripts puckishly note—the protection code's encryption password.

Meandering through the on-line everglade, the scripts gather comments from characters with similarly shadowy noms de plume like Boltar, Captain Kirk, and Hard Disk User. These divulge the secrets of stripping protection from programs the Victor overlooks.

How are copy protection vendors taking the assault? Concedes Ken Williams, vice president of research and development for Softguard Systems, "The guy's pretty bright. He knows his stuff. We certainly started tightening up our internal security to make his life a little more difficult."

Yet Williams says it's hard not to regard the Victor's exploits more as entertainment than as threat. "He cracks us up. We saw this dialogue on a bulletin board between the Lone Victor and these two guys, one of whom called himself Big Al and the other the Coffeeman," Williams says with a chuckle. "Watching traffic on the board and speculating on what the group looked like actually provided some of the most enjoyable hours we've had."

Prolok developer Vault Corporation, however, takes a dim view of the Lone Victor and his merry band. "They're common criminals," argues Executive Vice President Bengt Selander. For the past year, Vault has offered a $500 reward for documentation on the Victor's means of cracking Prolok. The company fully intends to make the award, according to Selander, but no one has yet asked for the bounty.

The Lone Victor isn't surprised. Public response to his handiwork,

Mercedes McDonald

he says, has been overwhelmingly favorable. People even offer to send him money for his debugging scripts, and he's responded with a plea that they instead donate blood to the American Red Cross.

The only serious grousing, he says, occurred when Vault allegedly called a SYSOP, insisted that the Lone Victor's files be removed from the system, and demanded to know who the guy was. Vault's Selander adamantly denies the story.

So who is this masked man? He says only that he likes using PCs and hanging out with his local user group. He also explains that his pseudonym, "The Lone Victor," was chosen in fond memory of his first desktop computer, a Victor 9000. Beyond that he's mum.

His voice was disarmingly ordinary. Affable, articulate, it was not the voice of someone who uploads rebellious files onto a bulletin board under a slightly demented alias. But then, maybe it was only the handkerchief over the receiver. *–Judy Getts*

Virtually Assured

In what other business would customers continually share rumors about a technical feature as deeply buried and fundamentally undramatic as an operating system?

The long-delayed next-generation DOS has begun to seem like a new phenomenon in this still youthful industry. But there's a curious parallel back in the annals of IBM.

"We're seeing the history of the mainframe all over again," suggests Ken Williams, vice president for research and development at Softguard Systems (and Lone Victor antagonist [see "The Silver Bullet(in Board)"]).

In the 1960s, IBM found itself with mainframe system software that was running out of steam. Mainframe DOS then was somewhat comparable to PC-DOS today: "The original architecture really had no hope of a growth path," Williams says.

IBM's eventual answer was Virtual Machine (VM), system software that allowed the mainframe to mimic multiple DOS systems and then to mix and match applications running under other operating systems. "It was customers, not IBM, who pushed VM; it solved endless conversion problems," Williams says. And it still does. "Today you'll find something written 15 years ago running side by side with something delivered last week."

The sweetness of this solution has led Softguard, Microsoft, Convergent Technologies, and others to try a similar approach on the 80386, using the chip's ability

(continues)

A Few Minutes With . . .

William Lowe, president of IBM's Entry Systems Division: "New devices and processes will give the developer and manufacturer greater flexibility in designing the PC of the 1990s. There clearly will be rapid growth in the performance of the base unit, but the more significant changes will come in supporting subsystems—storage and communications subsystems. They must be organized in a balanced way."

Philippe Kahn, head of Borland International: "When you see what's happening with new operating systems, [it looks like] the pop-up category will become even more important."

William Krause, 3Com president, on network rival Novell: "We've gone into their code so far we could tell you about the personalities of their software engineers."

Harvey Newquist, industry analyst at DM Data, on purchasing early 80386-based systems: "It's like saying, I have a Ford, and next year I'm going to buy a Ferrari, but there are three months left this year, so I'll run out and buy a Porsche. You don't really need that half-step."

Vern Raburn, Symantec president: "If you build a better mousetrap, will the world beat a path to your door? That's not always true—you have to find people with an uncontrollable urge to murder mice."

John Boyd, vice president for sales and marketing, AT&T Data Systems Division: "Too much of the technology that is offered today is up on the dashboard. We need to get it under the hood."

Judy Getts is a PC World *Contributing Editor who often interviews furtive characters, Marina Hirsch is an editor at Autodesk, G. Berton Latamore writes on computers and communications, and Daniel J. Rosenbaum examines the market success of technologically advanced products.*

Virtually Assured
(continued)

to support multiple virtual 8086s (see "The Soul of the 386" in this issue).

Unlike the mainframe case, however, this "hotel software" has trouble with unruly guests. In their maniacal quest for speed or unique functionality, PC software developers have committed every programming sin known to human or machine. The results are "pathological programs, out of control," Williams sums up.

So suppliers can't faithfully promise to intercept and mend this bizarre behavior all the time. This means that even in a virtual system, one application can doom another, or that a multiuser DOS may fail suddenly and completely.

Softguard is building a "control panel" into its VM/386 control software that will give users a choice between two modes of operation: "slow and safe, or fast and dangerous," as Williams says. And there are many other ways to tweak the PC as well. "If we're not careful, we just might saturate the user with options." *—E. B.*

MINX
Datapoint Corp.
9725 Datapoint Dr.
San Antonio, TX 78284
512/699-7355
List price: $8900

Super Micro/150 Advanced Personal Computer
Datavue Technical Systems
4355 International Blvd.
P.O. Box 2687
Norcross, GA 30093
404/564-5780
List price: $12,000 and up

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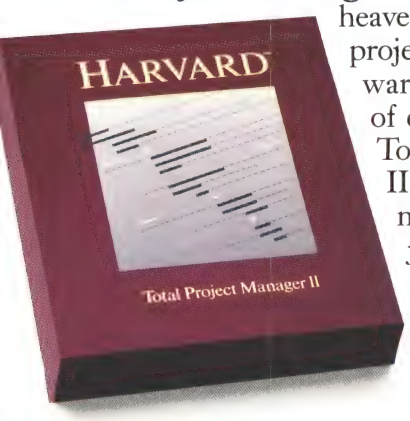

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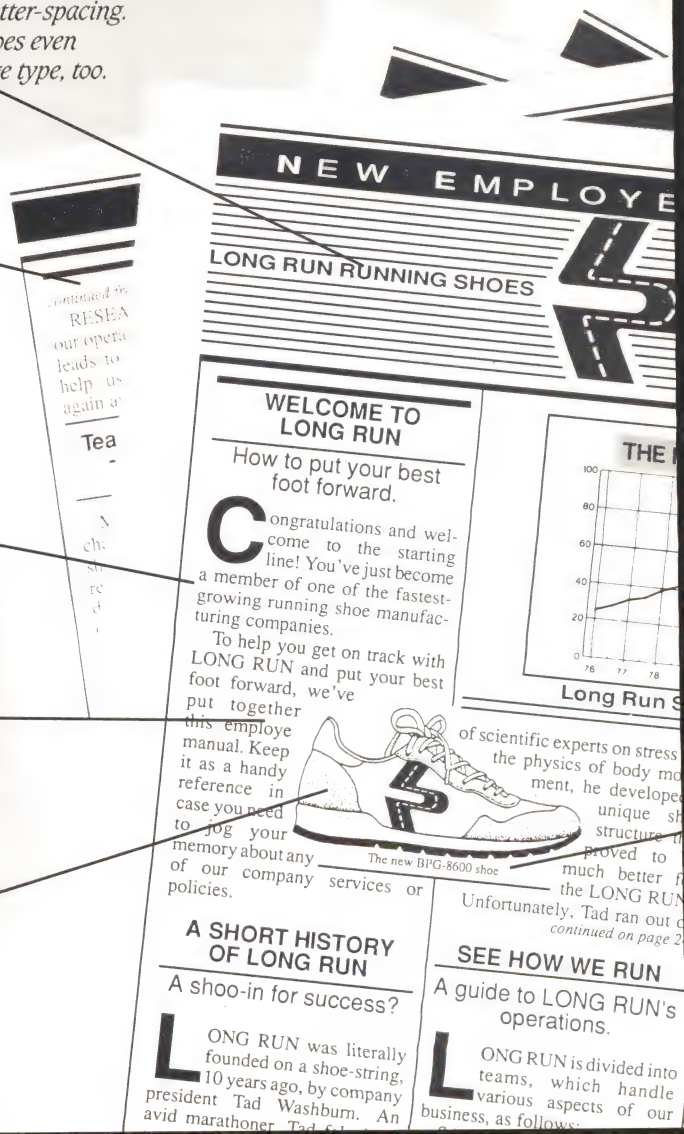

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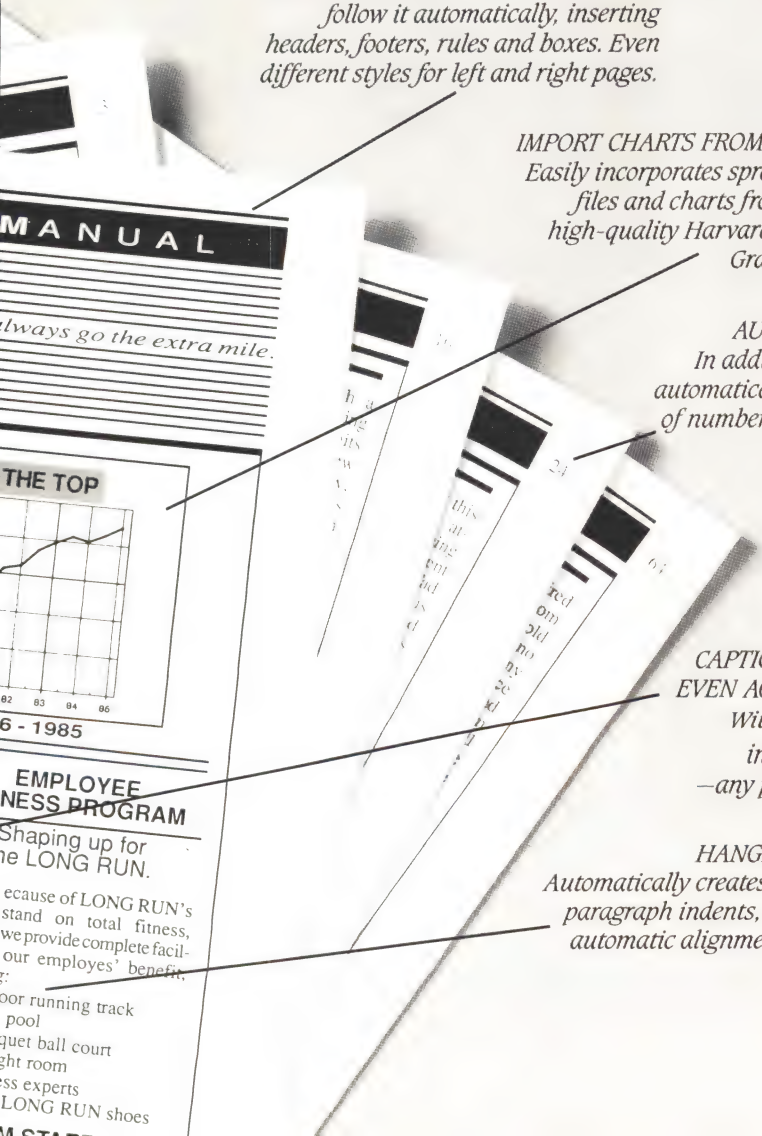

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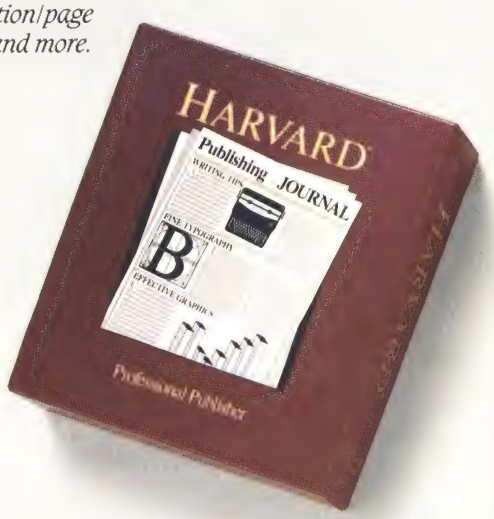

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1987 World Class PC Contest

Tom Bonaiuto

In the fifth annual World Class PC contest, PC World invites you to vote for your favorite hardware and software products—and maybe win some valuable prizes.

Christine Whyte

By now a time-honored tradition, the annual World Class PC contest gives readers the chance to voice their opinions on what's hot and what's not—simply by filling out the enclosed entry form. The results of this reader poll will be announced in *PC World*'s October issue.

The most popular product in each category will be designated a World Class Winner, and the most highly praised runners-up will share the limelight. The contest illuminates a galaxy of industry stars: the established veterans, the trendsetters, and the up-and-coming. So set your sights on our readers' choices for the best in the business—and see if they match your own.

Your reward for sending in an entry form is the chance to win one of three outstanding prizes in a random drawing. The first-prize winner will stagger home with the entire World Class PC system, valued at nearly $30,000 in last year's contest. The system consists of the champion desktop computer plus the winning products in 38 software and hardware categories. Second prize will be the most acclaimed transportable computer (designed to be portable but bigger than laptop); third prize will be the reigning laptop computer.

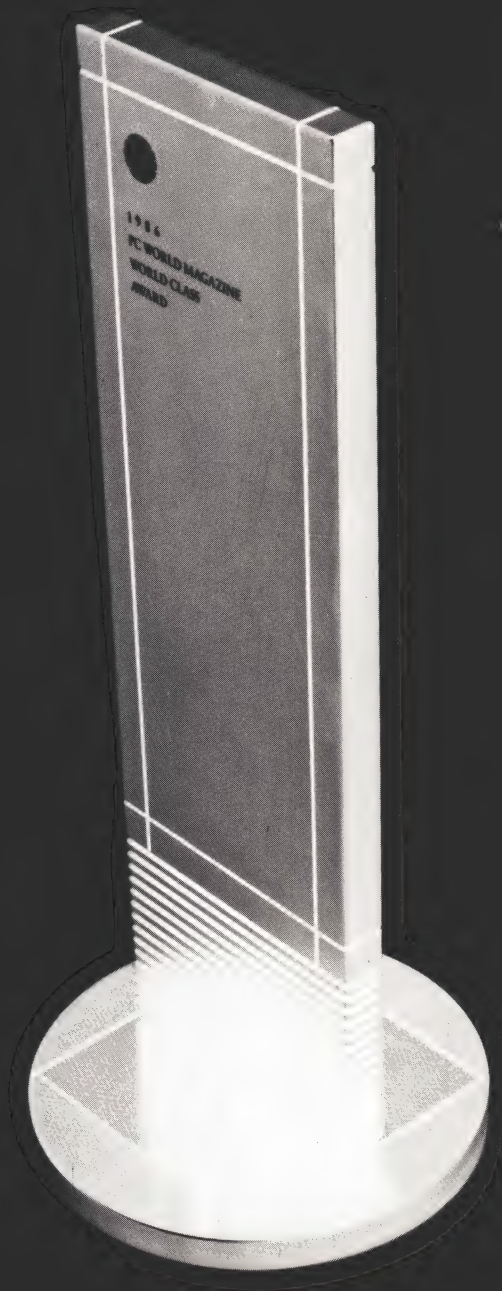
PC World thanks everyone who participates in this springtime ritual. (Granted, it's not as much fun as falling in love, but it sure beats paying taxes.) The votes not only provide valuable clues to readers' interests but are also a tribute to worthy products.

To help you cast your votes, here are some definitions for the product categories that aren't self-explanatory.

Dot Matrix/NLQ Printer
Provides dot matrix (draft) mode or combines dot matrix and near letter quality (NLQ) print modes.

Memory Expansion Board
Supplies additional memory (RAM) and may also offer a clock/calendar, parallel port, or serial port.

Graphics Board Vote for either monochrome or color.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Alternative Mass Storage With the exception of hard disk drives, this category includes all types of mass storage, such as removable cartridges, tape backup units, optical disk drives, and bubble memory.

Input Device Mice, keyboards, scanners, light pens, digitizer tablets, and so on.

Local Area Network The only category that will not be awarded as part of the World Class PC system. We include it on the ballot to find out how many of our readers use LANs and what they think of them.

Word Processing Support Tool Outline processors, spelling and style checkers, and thesauri.

Desktop Publishing Programs for page composition, font creation and editing, integration of text and graphics, typesetting, and word processing that support page formatting and laser printer fonts.

Financial Analysis Applications for creating and analyzing complex financial models, budgeting, and forecasting.

Data Management and File Management The first category includes the more powerful, typically relational data base programs that feature large record capacity, sophisticated report writers, and command languages. File management programs work like index cards, operate on only one file at a time, and are often used to maintain mailing lists.

Utility Programs that perform a wide variety of functions not typically provided by the operating system, such as keyboard enhancement, file conversion, file recovery, program development, disk emulation, and printer support.

Communications and Micro-to-Mainframe Communications The first group includes general communications programs for using electronic mail, bulletin boards, and information services. Programs in the latter group are designed for terminal emulation and data conversion.

Desktop Management Duplicates the functions of such accessories as a Rolodex, a notepad, a calculator, a calendar, and an appointment scheduler.

Integrated Includes several applications–usually word processing, spreadsheet, graphics, and data management–that share a command structure and data. The applications may be on one disk or in separate modules.

Operating Environment An operating system extension, often called a windowing environment, that integrates any number of off-the-shelf applications.

Graphics–Business, CAD, and Drawing Business graphics programs usually produce several types of charts and are used for business presentations. CAD (computer-aided design) programs are used for drafting and modeling in design, engineering, and architecture. Drawing (or paint) programs combine freehand creations with clip art, symbols, and text in various font styles and sizes.

Project Management Manages resources and scheduling of projects and tasks.

Personal Management Monitors personal finances, keeps household records, and organizes personal data.

Investment Performs portfolio management, technical and fundamental analysis, and stock information retrieval.

Training and Education Training programs provide tutorials on such subjects as typing and on PC applications–for example, word processing and spreadsheets. Education programs teach classroom subjects or prepare students for college entrance exams. *PCW*

Vertical Market Application Dedicated programs or templates designed for engineers, lawyers, doctors, dentists, realtors, and other professionals.

Most Promising Newcomer Which recent arrivals–in both hardware and software–are making a splash? *Recent* as defined here means released since September 1986. You may vote for a product you've already cited in another category.

Contest Rules Each person may enter the contest only once. Type or print your choices on the entry form included in this issue of *PC World* or on a reasonable facsimile of that form. Employees of product manufacturers are eligible to vote for any products other than those sold by their company. Your entry must include your product votes and your name, address, and daytime telephone number. Entries must be postmarked no later than April 20, 1987. Employees of PC World Communications, Inc., and CW Communications, Inc., are not eligible. Please tape the form closed; do NOT staple the form. Thank you and good luck!

Christine Whyte is the Product Review Editor for PC World.

1987 World Class PC Contest Entry Form

Dear Reader: Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you don't have to vote in all categories. Eligible products must be IBM PC compatible and commercially available as of March 1, 1987. **Note: To ensure accuracy, a vote will not be counted unless the following three items are provided: (1) correct product name, (2) manufacturer name, and (3) model number (for hardware only).** Please print or type your entry and submit it by April 20, 1987.

Name _____

Company _____

Address _____

City _____ State _____

ZIP _____ Daytime phone _____

Hardware

	Manufacturer	Product	Model
Desktop Computer (first prize)			
Transportable Computer (second prize)			
Laptop Computer (third prize)			
Dot Matrix/NLQ Printer			
Laser Printer			
Color Monitor			
Modem			
Memory Expansion Board			
Graphics Board			
Hard Disk Drive			
Alternative Mass Storage			
Plotter			
Input Device			
Local Area Network			
Most Promising Newcomer—Hardware			

Software

	Manufacturer	Product
Word Processing		
Word Processing Support Tool		
Desktop Publishing		
Spreadsheet		
Financial Analysis		
Data Management		
File Management		
Utility		
Communications		
Micro-to-Mainframe Communications		
Desktop Management		
Programming Language		
Integrated		
Operating Environment		
Game		
Graphics—Business		
Graphics—CAD		
Graphics—Drawing		
Accounting		
Project Management		
Tax Planning or Preparation		
Personal Management		
Investment		
Training		
Education		
Vertical Market Application		
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AN INVITATION FROM THE #1 DATABASE SOFTWARE.

Rated # 1 By DataPro.

"Microrim's R:BASE System V far outshines its competition."

– DataPro Reports

Best Data Management Software of 1986.

– PC Magazine

"...A superset of dBASE III Plus functionality."

– InfoWorld

"...You've simply got to look at R:BASE System V. It's brilliant."

– Jim Seymour
PC Week

PLAY WITH YOUR DATA.

When we created R:BASE® System V, the whole idea was to make the full power of a sophisticated relational database available to people who don't feel like programming. Thanks to your enthusiasm, it's been quite a success. With our Express System, R:BASE System V offers you a combination of speed, power, and flexibility that's literally not available with any other DBMS. And now, we're introducing a new presentation graphics package that gives you the opportunity to play with your numbers and ideas in graph form.

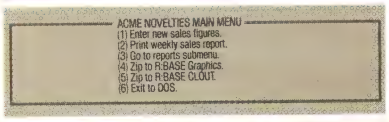
But first, let's take a look at R:BASE System V, the product which makes R:BASE Graphics a powerful tool for understanding.

DATA MANAGEMENT RESULTS IN HOURS – NOT MONTHS.

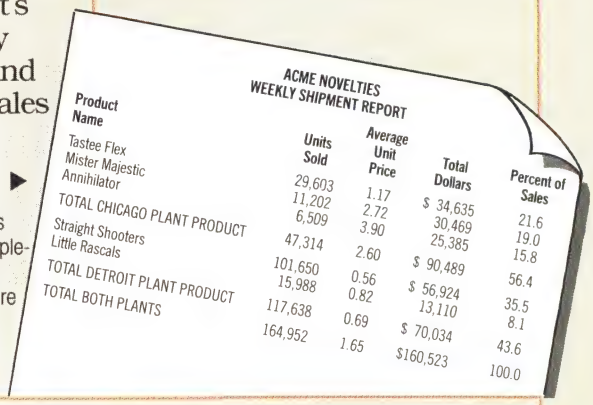
With R:BASE System V, no matter how sophisticated the application, you just follow a simple, fill-in-the-blanks format, and our Application EXPRESS writes all the code automatically.

As a result, even as a first-time user, you can build a powerful, automated application. With the features you'd expect in a custom program from a professional programmer.

When you're done, you'll have automated the process of understanding your data. And be able to use it to make better decisions. With other database products, building an application like that could take months. But for a fairly typical application, with R:BASE System V, it's a matter of hours. For example, let's take a look at a company called ACME Novelties and follow them through a sales analysis.



▲ With our Express System, it's easy to build an automated application without programming. From this point on, any of these functions can be performed by a simple menu pick.



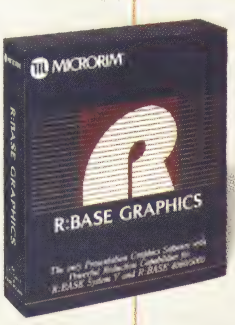
ACME NOVELTIES
WEEKLY SHIPMENT REPORT

Product Name	Units Sold	Average Unit Price	Total Dollars	Percent of Sales
Tastee Flex	29,603	1.17	$ 34,635	21.6
Mister Majestic	11,202	2.72	30,469	19.0
Annihilator	6,509	3.90	25,385	15.8
TOTAL CHICAGO PLANT PRODUCT	47,314	2.60	$ 90,489	56.4
Straight Shooters	101,650	0.56	$ 56,924	35.5
Little Rascals	15,988	0.82	13,110	8.1
TOTAL DETROIT PLANT PRODUCT	117,638	0.69	$ 70,034	43.6
TOTAL BOTH PLANTS	164,952	1.65	$160,523	100.0

▶ To update a report like this takes just a few keystrokes, even though it contains computed columns, subtotals, and multiple-table access. And this is just the beginning; with new R:BASE Graphics, there are literally thousands of ways to play with these numbers.

INTRODUCING R:BASE GRAPHICS. TURN RAW DATA INTO PURE UNDERSTANDING.

Of the 100-plus graphics products on the market, this is the only one that works directly with R:BASE System V or R:BASE 5000/4000 data. And the only one that combines presentation-level graphics with powerful data reduction capabilities. With just a few keystrokes, R:BASE Graphics can sort through megabytes of data, retrieve just the data you're interested in, compare items any way you like, and put them into presentation-quality chart or graph form.



You won't even have to interrupt your train of thought. With R:BASE Graphics, you keep right on using the same familiar interface. You enjoy a totally integrated solution that turns raw data into pure understanding. And now you can express it graphically.

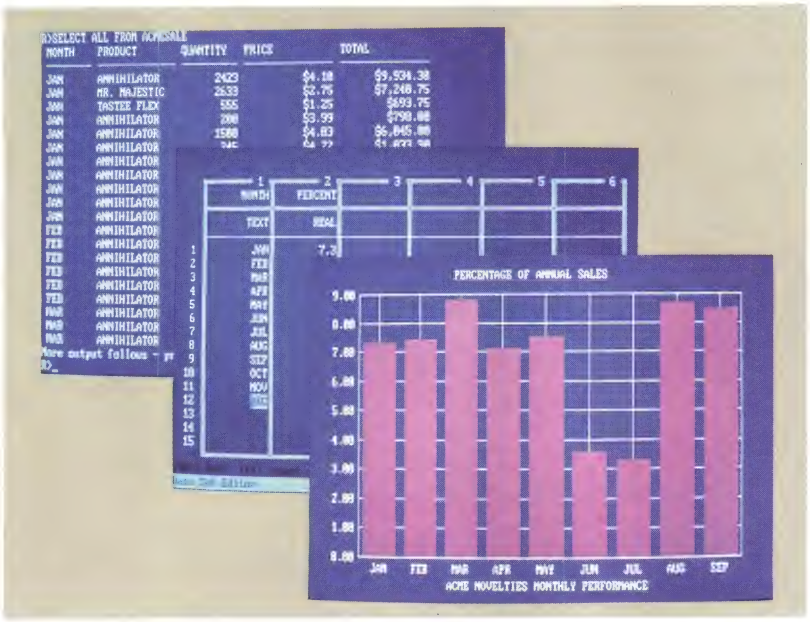
Let's take a look at the example here and see how the process works. The first screen you see is raw, un-

sorted R:BASE data. (This is the same data R:BASE System V would use to give you the ACME Novelties weekly sales report.) All you do is tell R:BASE Graphics what you want, and how you want it. It goes into the database, performs the sorting requests, and creates a graphable subset of the database. If you want a column graph that compares total product sales by month, all it takes is a few keystrokes, and you've got it.

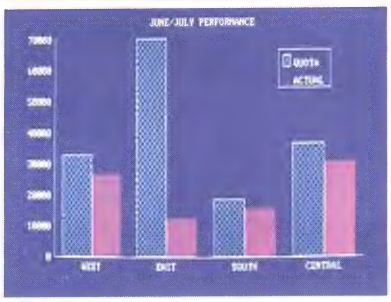
Of course, this is only one example; with R:BASE Graphics, using a database to reach new levels of understanding is limited only by the imagination.

R:BASE Graphics gives you eight standard chart or graph formats, plus seven text fonts, 16 colors, and up to 32 windows of split-screen displays. R:BASE System V SuperMath functions have also been included for precise data handling. In all, there are over 40 mathematical, trigonometric, logical and financial operations. Of course, R:BASE Graphics supports most popular video control cards, plotters, and printers.

As you've already seen, by using R:BASE Graphics, ACME Novelties graphically identified their problem area: The Eastern Region. Now we'd like to show you another product that lets ACME review their data in a completely different way. R:BASE CLOUT.®



▲ By breaking your sales down into percentage by month, and reviewing the data graphically, it's clear that something went seriously wrong in June and July, but as yet, nobody knows where.



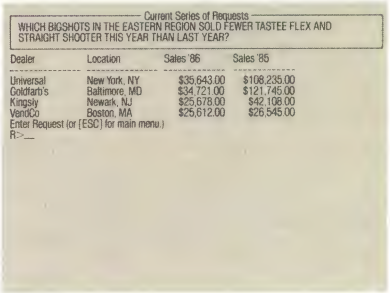
Even though the data for quotas and actuals are stored in different tables, all you need to do is define what should appear on the chart. Now we see that the problem is weak sales in the Eastern Region. And come one step closer to turning a problem into a solution. ▶

R:BASE CLOUT. THE DATA RETRIEVAL SOFTWARE THAT SPEAKS YOUR LANGUAGE. ENGLISH.

This artificial intelligence, natural language query software gives you another option. You just type your requests in plain English. CLOUT figures out exactly how to get the answers by translating common questions into computer commands.

CLOUT's natural language dictionary contains 300 commonly used words, and you can add 500 more (with definitions) per database. By adding unique definitions, you can customize CLOUT to your specific needs. Now let's go back to our example for a minute:

From R:BASE Graphics, we saw the problem at ACME Novelties was weak sales in the Eastern Region. Now the question is—who's responsible? Suppose we had taught CLOUT that the name for distributors was "bigshots."



▲ By exploring your data with CLOUT—our natural query language—you've managed to pinpoint the entire problem by typing in one sentence. From this point on, the answer looks to be a visit to the distributors. Which is about the only thing CLOUT can't do for you.

And that, in a nutshell, is what it's like to play with R:BASE System V—along with our R:BASE Graphics and R:BASE CLOUT options. The whole process is simple, natural and intuitive.

R:BASE DATA MANAGEMENT. NOBODY GIVES YOU MORE POWER. MORE FLEXIBILITY. OR MORE WAYS TO USE IT.

Besides R:BASE System V, Graphics and CLOUT, we also offer you a number of options for ultra heavy-duty programming.

R:BASE Extended Report Writer (XRW) goes beyond the power and control provided in the R:BASE System V and R:BASE 5000 report writers. You can create complex reports with up to 250 lines per page and more than 255 character page widths. XRW also gives you the flexibility of conditional processing, substring extraction and the ability to assign over 200 variables. As a result, you can take complete command over every character on every report.

Then there's R:BASE Program Interface, a library of relocatable routines that provide access to R:BASE data for applications written in Microsoft FORTRAN, C and Pascal. Which gives you application development flexibility that may not be available in a database programming language. By using Program Interface, it's possible to develop a wide variety of scientific, statistical, and advanced business applications.

Finally, there's R:BASE Runtime. For developers who have created a popular application with R:BASE System V, or R:BASE 5000/4000, this is the way to distribute it to additional users at minimum cost. Each Runtime package contains all the software you need to distribute five complete applications.

In addition to all the solutions Microrim offers, there's also a large—and growing—number of third-party utilities, programs, applications, and reference books. All of which give you even more reasons to make R:BASE System V the database you ask for and use.

R:BASE System V and all the Companion Products will run on your standalone IBM personal computer (and 100% compatibles) and support your IBM PC-Net, Token Ring, or 100% compatible local area network.

SEE FOR YOURSELF: CALL 1-800-547-4000.

No matter what kind of information you need from a database, the R:BASE product family will make the process simpler, and the insights more valuable. If you want to see just how fast, powerful, and flexible we really are, just ask your software dealer for a trial run. Or if you'd rather, we'll send you a fully-functional R:BASE System V Trial Version for only $19.95, plus shipping. It's a complete 11-disk package limited only by the size of the database you can build. Just call 1-800-547-4000, Dept. 805. In Oregon, or outside the U.S., call 1-503-684-3000, Dept. 805. Call us soon.

R:BASE DATA MANAGEMENT FROM MICRORIM

R:BASE companion products are fully compatible with all versions of R:BASE databases: System V/5000/4000. Microrim, R:BASE and CLOUT are registered trademarks of Microrim, Inc. IBM is a registered trademark of International Business Machines.

Product Outlook

News you can use about recent PC product announcements and upcoming releases

Borland chooses its words carefully, Compaq shrinks its footprint, Lotus delivers the mail, software clones challenge the champs, a host of notable face-lifts, and much more

Ken Greenberg

Turbo Writing

If you've longed to break off your affair with your word processor but haven't had the stomach for a big scene, Borland International is offering an appealing exit with ◆***Sprint: The Word Processor,*** a many-splendored package at the traditional Borland price.

Sprint's secret is a rich set of macros that emulate the word processor you may already be using. The $99.95 program is packaged with routines that mimic the feel, if not the look, of *WordStar, Microsoft Word, WordPerfect,* and *pfs:write.*

But here, beauty isn't only skin deep. Beneath the macro files is a feature-laden word processor that's as customizable as an application program can be. Indeed, Borland is touting *Sprint* as a word processing *environment.* The firm has put a pop-up menu face on *FinalWord II* and given it company in the form of a capable DOS shell, PostScript support, file headers, a print formatter, and abundant macro source code.

Designed for secretarial pools and assorted heavy-duty word processing users, the *Sprint* shell, or access system, enables you to create menus for—and run—other programs from within the word processor. It also provides automatic backup of as many as 25 simultaneously open files and supplies a document header file (and a capability to search and sort on that data). The system's archive feature groups related files under a single name, which appears in the directory.

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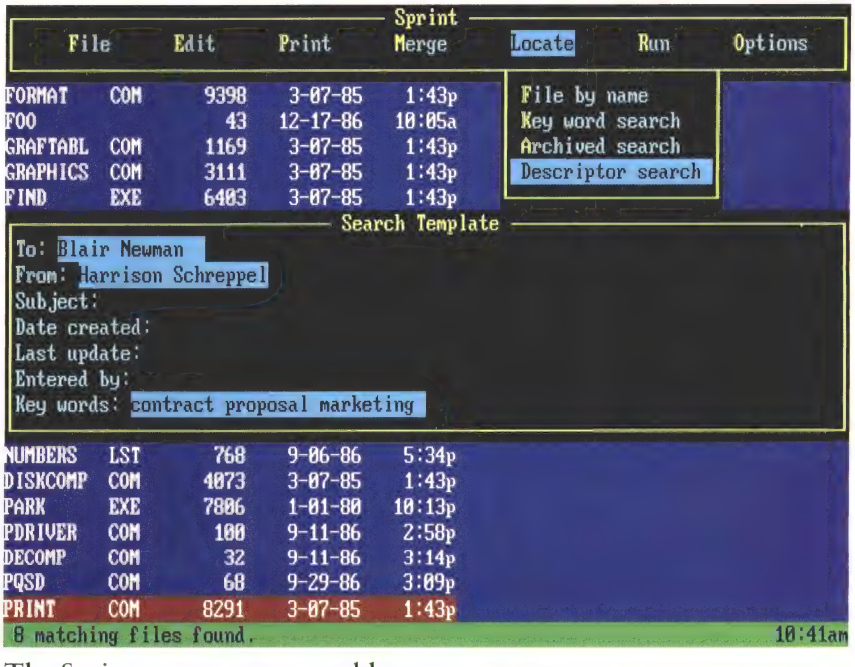
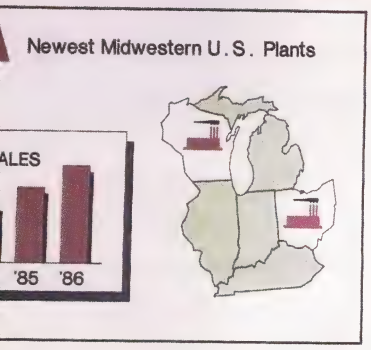
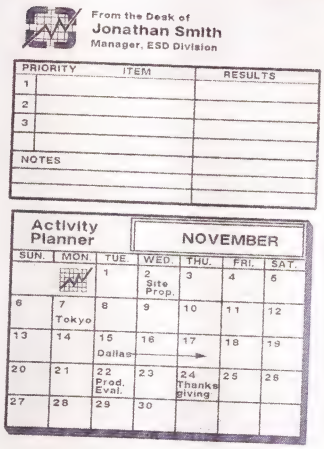
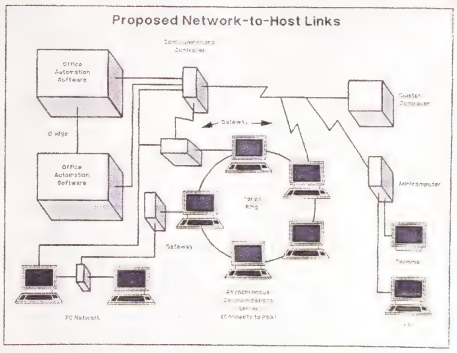


The Sprint access system enables you to create menus for—and run—other programs from within the word processor. This screen, of the file manager, shows the results of a search of the file document descriptors.







Lotus® always wanted to get into pictures. It was just a matter of getting the product exactly right.

That's why Freelance® Plus is big news. It's a powerful graphics package for business that adds real punch, real impact to all your work. Whether it's memos, reports, forms, bulletins, schedules or full-blown presentations.

Freelance Plus works with many popular PC software packages. Like 1-2-3,® Symphony,® Graphwriter,® Freelance Maps and dBase.® Plus you can use it with programs like Lotus Manuscript™ to merge text and graphics into a single document.

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And the best part is, the more you use it, the more you'll discover you can do with it.

Freelance Plus. Designed to become the standard for business graphics. Because it allows you to picture what you're trying to say.

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Lotus Freelance Plus

The one graphics product for presentations, reports and everyday business communications.

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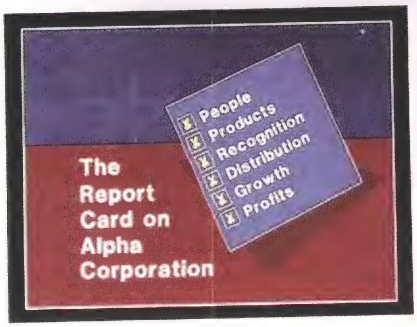


Customer Service Dept.
Metro-Manufacturing Group, Inc.
2501 W.Shawmut Blvd.
Chicago, Ill. 60649

Bulletin for March/April 1986

New Phone System

This spring our department will be receiving a new phone system to handle the greatly increased volume of phone calls due to the success of our new advertising campaign that kicked off in February. The new system should greatly reduce the waiting time and frustration of our faithful customers. We will be able to handle 30% more calls per day. In addition, we will be expanding our staff to allow greater time with each customer call.

Good Work!

For the month of January, our total number of complaint calls dropped 10%. Good work, people! We think your hard work in the past two years has paid off.

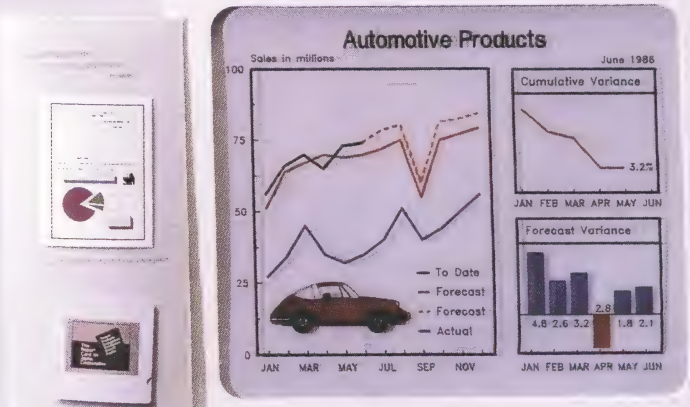
New Supervisor

A new supervisor will be starting work in our Dallas office. Give her all the support she deserves. She hails from Fort Wayne and it blowing up after a short stint with that "diner" company whose name we won't mention. Welcome aboard, Shirley!

This bulletin was prepared entirely on Metro-M's new Freelance Graphics software. Take advantage of it on your own PC — it's flexible and powerful enough to put this bulletin out without a great deal of effort or time on the editor's part.

One Program
charts, symbols
diagrams, etc., etc.

Overheads
+ Slides, too.



Switching to the *Sprint* editor shrinks the access system to 1K. The editor's pop-up menus move to wherever the cursor isn't, or you can expedite selections through the function keys. *Sprint*'s windowing feature keeps up to six files (from any directory) active on the screen at one time and enables you to cut and paste text between those files. The editor includes an undo command; a calculate function that can parse words (to find and change case, for example); an ability to transpose letters or words; support for multiline headers, footers, and footnotes; and automatic generation of indexes and tables of contents. The program's spelling checker and thesaurus rely on Borland's *Turbo Lightning* engine. An import facility enables *Sprint* to read *Microsoft Word*, *WordStar*, and *pfs:write* files.

Sprint's document formatting macros function much like *Word*'s Glossary feature. Hard on the macro trail, Borland is also mulling over the release of routines that will endow the product with the outlining and math features of the programs it apes. *Sprint* will be available during the second quarter of this year. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-8696.

The Incredible Shrinking Compaq

Here's your portable computing dilemma: A laptop compromises performance; a transportable compromises mobility. Compaq's solution is the ◆**Portable III**, the company's smallest, fastest 80286-based machine—and perhaps the first Compaq to truly merit the term *portable*.

Consider: This Compaq really does fit under an airline seat. It tips the scales at about 19 pounds, and it won't yank your arm out of

POWER OF

THE EPSON® LASER PRINTER IS HERE.

From the industry's leading name in dot matrix printers comes an even more powerful communications tool.

The Epson GQ-3500 laser printer. A machine that can bring the power of a printing press to your office, and add new authority and polish to everything you write. With elegant layouts. Professional-looking text. Bold, fully-formed headlines. And attention-getting, 300 DPI graphics.

Let's get down to specs.

The Epson GQ-3500 has what it takes to handle an enormous variety of high quality printing jobs, from correspondence and newsletters to reports with integrated graphics. Seven resident fonts and two user accessible IC card slots give you a wide selection of type styles and sizes to choose from, and built-in 640K memory lets you print up to one-half page of 300 DPI graphics. To make things even easier, the GQ-3500 also comes with the new SelecType IV Control Panel, for upfront, push-button command of eleven key printer functions.

All of this in a machine that's 37% smaller and 49% lighter than the HP Laserjet Plus.™ A machine that works

its socket. On the desk, the Portable III measures a compact 16 inches by 14 inches. The diminutive unit replaces the heftier Portable 286.

At $4995, the Compaq Portable III Model 20 includes 640K expandable to 6.6MB; one ⅓-height 5¼-inch floppy disk drive; a 20MB hard disk; a flat panel, 640-by-400-pixel, text-and-graphics gas plasma display; a full-size Portable II-style keyboard; and serial, parallel, and RGB ports. The machine's CPU runs at 12 MHz when floored or can perform at a more sedate 8 MHz. The Model 40 ups the hard drive to 40MB. Among the major options are a 1200-bps internal modem and a rear-mounted expansion box that can house two full-size boards. The Portable III is not battery powered. Compaq Computer, 20555 FM 149, Houston, TX 77070; 713/370-0670.

◆

Lotus's Appointed Rounds

Unlike its hard copy counterpart, electronic mail doesn't land with a thud. You can't really know what, if anything, awaits in your mailbox without quitting your current program, logging on, and scrolling through a boring mélange of prompts, house ads, and menus.

◆*Lotus Express* means to change all that. A communications package paired with MCI Mail, *Express* enables you to blithely continue with business while the program fetches your messages—and you needn't bother calling MCI at all. To send mail, you simply create a message locally (using the *Express* editor) and select Transmit. At intervals you've specified, the program calls MCI in the background, pulls down any missives you've received, and transmits whatever's waiting in your local outbox. The program will beep you when the mail has been picked up, or you can check the

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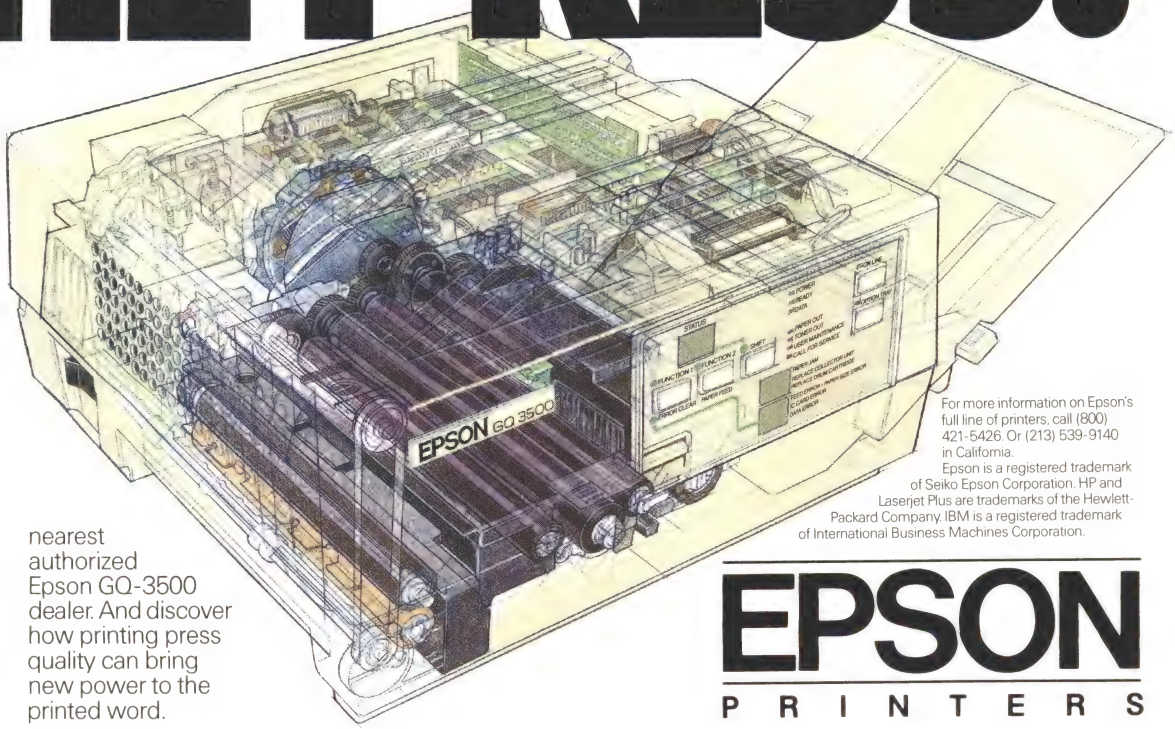
THE PRESS.



with the vast majority of IBM® compatible hardware and software, and comes with our one-year limited warranty. A machine that's all yours for a price as outstanding as its performance.

It's just what you'd expect from Epson, the company that's been setting industry standards in reliability, innovation and value for more than twenty years.

To experience the Epson GQ-3500 laser printer for yourself, visit your nearest authorized Epson GQ-3500 dealer. And discover how printing press quality can bring new power to the printed word.

For more information on Epson's full line of printers, call (800) 421-5426. Or (213) 539-9140 in California.

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EPSON
PRINTERS

Nobody ever thinks of PC AT batteries until it's too late.

Without a functioning battery, your computer is as good as dead. The battery in your PC AT or compatible controls your computer's configuration files, real time clock, and calendar. When the clock and calendar begin to fail, your battery's hours are numbered.

So be prepared. Get the best replacement battery you can buy. Get a TADIRAN battery from IBC—the high quality, high energy lithium battery that is already found in 80% of all PC ATs and compatibles as original equipment.

A unique **3 year warranty, 10 year shelf life**, and **UL approval** make a TADIRAN replacement battery the best insurance there is. So don't wait until your computer battery dies. Get a TADIRAN replacement battery from IBC today.

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Circle 756 on reader service card

Express outbox at your leisure. Everything is saved in appropriate folders on your disk.

Express can send any binary file—including worksheets with formulas and formats intact, as well as data base and graphics files. The program even has its own scheme for collecting data from forms. For bigger jobs, *Express* will work with mailing lists from MCI Mail or lists created with the editor. A RAM-resident program, *Express* consumes 200K and can be discarded from memory with a few keystrokes.

Although coupled with MCI Mail, *Express* also runs on IBM's PROFS and DEC's All-in-One electronic mail systems. *Express* can be integrated with *Metro*, the Lotus makeover of *Spotlight* that functions as an office-based task manager. *Express* lists for $100; add $10 to rent an MCI Mail box for one year. Lotus Development, 55 Cambridge Pkwy., Cambridge, MA 02142; 617/577-8500.

PC Talkin'

You're a diehard. You've been using *PC-Talk* since the days when 300 bps was considered sizzling. But you're now tempted by tales of communications programs that do everything but tie your shoes.

You're exactly the person Headlands Communications Corporation had in mind when the company developed ◆***PC-Talk 4,*** a robust revision of the package that

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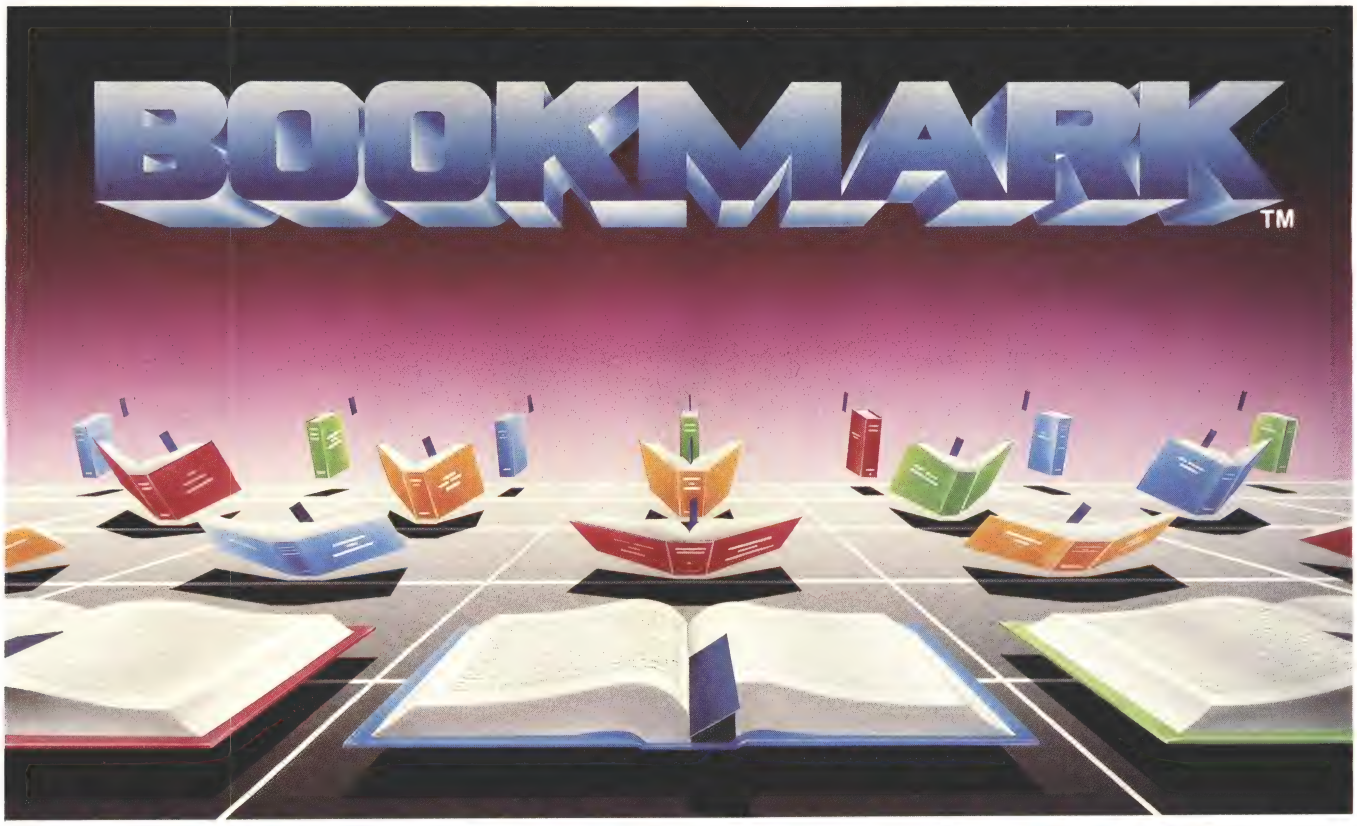

BOOKMARK™ Data Protection Software

Automatically marks your place so you can resume where you left off.

Runs with most software so if you decide to call it a day you can power down, and upon restart BOOKMARK will bring you back where you left off...it's like having a BOOKMARK in your computer!

Stop wasting time navigating through menus . . . or teaching novices.

Easy to use. You choose how often work is saved, by number of keystrokes or length of time.

Work in progress can be resumed within seconds after system crash, power failure, accidental reset or power down.

Costly battery backup systems are no longer needed when work in progress is already saved to the point of the previous BOOKMARK placement.

BOOKMARK is a memory-resident utility that automatically and periodically saves work in progress to a reserved area of the hard disk.

Suggested Retail Price **$69.95**

Requirements:
IBM PC/XT/AT or 100% Compatible
64k to 640k
IBM DOS 2.1 or Higher
1 Floppy Disk Drive • Hard Disk Drive (10 Megbytes Minimum) • Video Display Adapter, IBM (Monochrome, Color, Enhanced Color), Hercules, AST
(BOOKMARK occupies an equivalent space on hard disk as in system RAM plus video RAM)

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Circle 995 on reader service card

launched the freeware business. This time around, however, the program has moved out of the public domain and into retail channels. At $129, *PC-Talk 4* is more malleable than its predecessors, appealing to the faithful with its improved talent for macros and programmable defaults. You can, for example, include time delays or access the dialing directory in a macro, and you can invoke a macro from the command line.

Should you want to place a department—or an entire company—in the *PC-Talk 4* dialing directory, the program will oblige, thanks to a directory capacity of nearly 1000 entries. A split-screen feature now segregates keyboard input from downloaded data. *PC-Talk 4* can emulate any of 34 terminal types, provide access to any DOS command from within the program, and fully support subdirectories and path names. If mum's the word in your office, the program's silent mode cuts the switch on all audio. The revised program also supports the XMODEM.CRC error-checking protocol.

Veteran users will doubtless appreciate the program's bound manual and beefed-up support lines. Headlands is tossing in a discounted membership to The Source, plus 30 days of free access to the *Official Airline Guide*. *PC-Talk 4* is available at an introductory price of $99. And at Headlands, user loyalty still counts: Registered *PC-Talk* owners are entitled to 70 percent off the list price. Headlands Communications, 1624 Tiburon Blvd., Tiburon, CA 94920; 415/435-0770.

High Fiber

For organizations layered like onions, finding a program capable of handling financial grunt work without tears can be a daunting assignment.

(continues)

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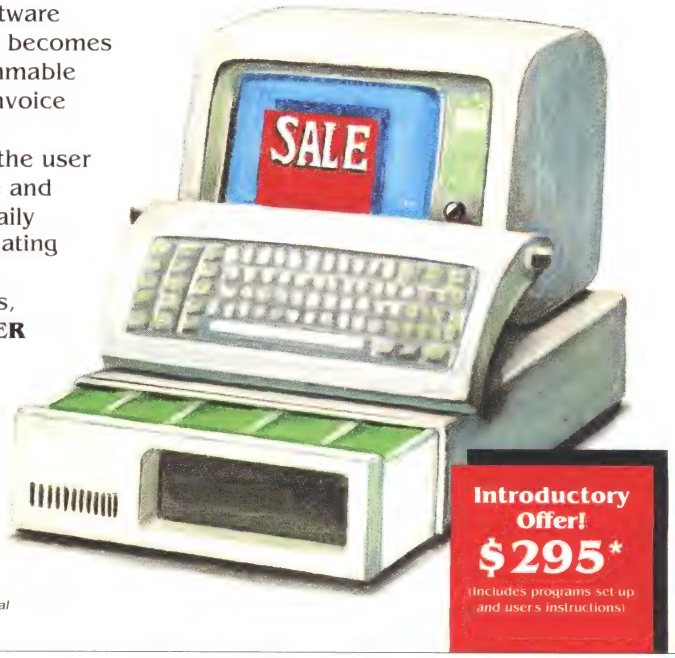

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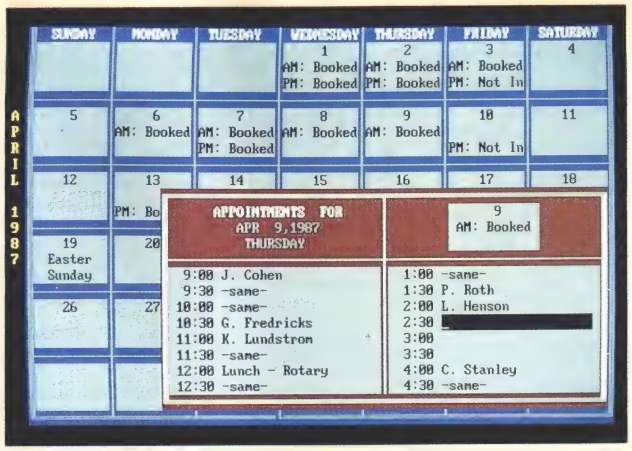
BOB STANTON HAD A GREAT IDEA. AN HOUR LATER HE WAS TESTING IT.



Appointments. Everybody takes them — dentists, auto-body shops, dance instructors. And lots of computer applications need appointment screens.

Bob thought that a calendar made a terrific graphic metaphor for taking appointments. Simply use the arrow keys to pick an open date, then press the Enter key, and up pops an appointment window.

Lucky for Bob, he's a CLARION programmer, one of a fast growing cadre of super-productive application developers.

With CLARION's Screener utility, he painted a white calendar on a black background. Then he drew a white-on-blue track around the page and between the days. He typed in the days of the week — and *voila!* — a calendar!

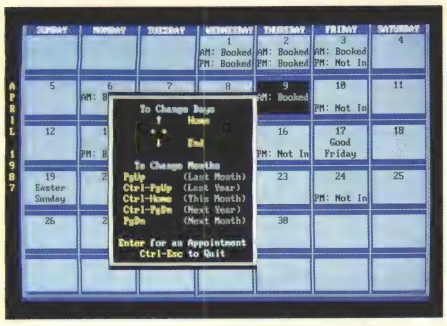
CLARION knows that a PC monitor is refreshed from memory, so it treats a screen layout like a group of variables. Just move data to a screen variable, and it shows up on the monitor.

Bob set up dimensioned screen variables for the days of the month and a screen pointer for selecting a date, and he was done. Then Screener generated the code .

Then Bob drew the appointments window, built an appointment file, filled in the connecting code and tested it — ONE HOUR AFTER HE STARTED!

Testing was a breeze. Screener doesn't just write code, it compiles your source, displays a screen, gets the changes, then replaces the old code in your program.

So here are Bob's appointment screens. You can see the source listing to the right. We marked all the code Screener wrote for him.



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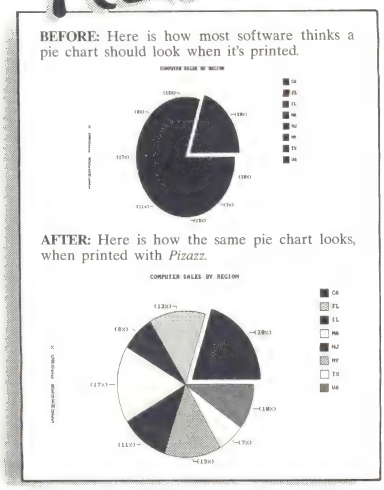

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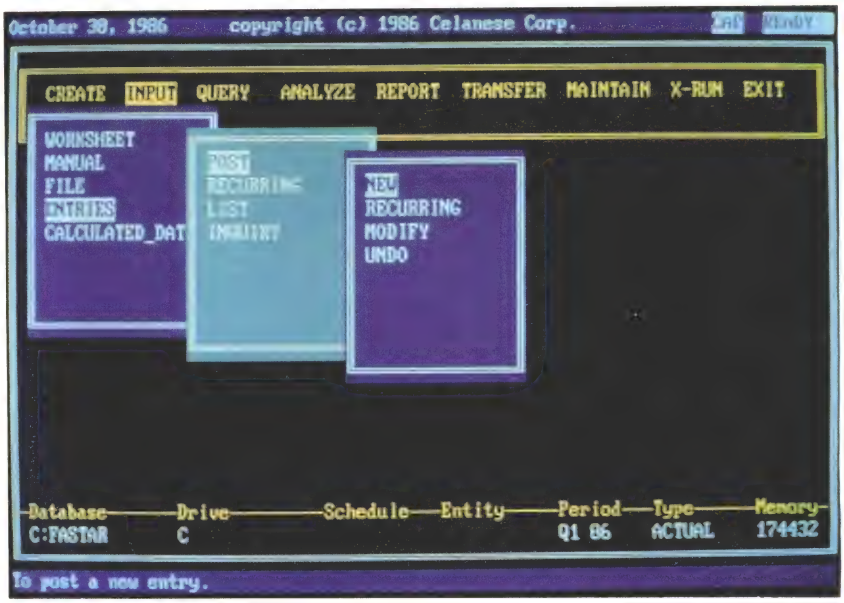

Corporate Class Software's FASTAR features a "sliding windows" interface that displays a collapsible hierarchy of pop-up menus.

Enter ◆*FASTAR* (Financial Application Solutions to Analysis and Reporting)—the first offering from Corporate Class Software, a well-heeled subsidiary of Celanese Corporation, the New York chemical and fiber concern. No shrinking violet, *FASTAR* is a powerhouse financial environment geared for members of the Fortune 1000—Big Eight consultants, information centers, financial analysts, and accountants. The program picks up where *1-2-3* and most accounting packages leave off, shipping lower-level data out for analyses that are performed higher on the organizational ladder. Strictly speaking, *FASTAR* isn't a personal product; it's departmental in scope, with a $25,000 price tag aimed at work groups of up to 25 users.

FASTAR is heady stuff, able to work with unlimited organizational structures, automatically create journal entries, manage financial schedules according to accounting periods, and perform currency conversions painlessly. You can consolidate data, define queries, and generate reports ad hoc, thanks in part to the program's unique data schema: Every item is structured according to schedule (such as balance sheets), entity (division), period (quarterly), and type (actual or budget).

Corporate Class enlisted Micro Data Base Systems—the folks responsible for *Knowledge Man* and *Guru*—to downsize a Celanese mainframe system. Corporate Class then devised a slick, "sliding windows" interface that displays a collapsible hierarchy of pop-up menus.

(continues)

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FASTAR doesn't ask you to relinquish a single byte of *1-2-3* data. Instead, the product blankets *1-2-3*, reading and writing data and formulas, creating worksheets on the fly, and supporting queries of the *FASTAR* data base via *1-2-3*. The program also accepts data from *dBASE*, Dow Jones News/Retrieval, and a host of mainframe data bases and accounting packages. Company-specific requirements can be entered via *FASTAR*'s dictionary feature. Corporate Class Software, 1211 Avenue of the Americas, New York, NY 10036; 212/719-8434.

Shadowing dBASE

If you're looking for *dBASE* power and familiarity at a fraction of the price, WordTech would like a few moments with your computer.

Long a thorn in Ashton-Tate's side (first with *dBIII Compiler* and then with *Quicksilver*, its successor), WordTech has rolled out a full-featured $169 *dBASE III Plus* look-alike called ◆***dBXL***. True to the XL in the product's name—which denotes "extended language"—WordTech has managed to load *dBXL* with additional *dBASE* language commands, and yet has sculpted a program that won't unnerve users who don't know the difference between the DOS prompt and a dot prompt. WordTech's counterpart to the *dBASE* Assistant is *dBXL* Intro, menu-driven hand-holding that enables new users to get to work quickly.

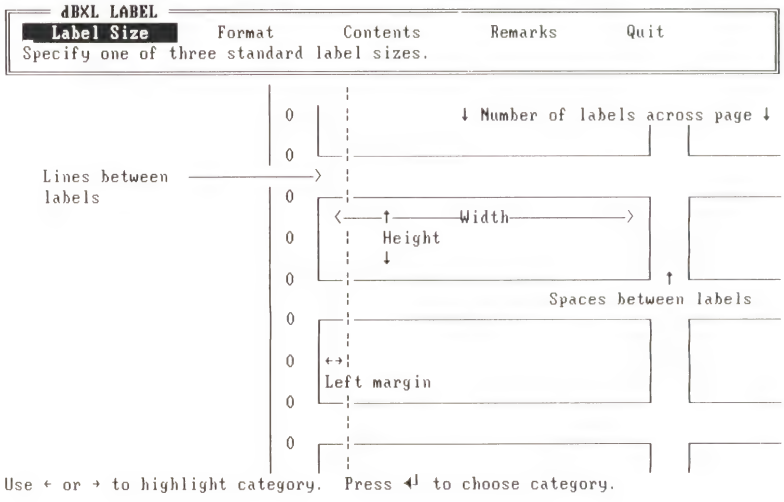
If you've mastered *dBASE* syntax, that skill won't go to waste here. Your *dBASE* files are likewise safe in *dBXL*: They'll run unmodified, and *dBXL* files bear the familiar .DBF extension. While it lacks a compiler of its own, *dBXL* works with *Quicksilver* and WordTech's *Networker* file server package.

dBASE programmers developing turnkey applications are apt to like *dBXL*'s ensemble of windowing commands, which provide programs with a bit of panache. In *dBXL*, up to ten data files can be open simultaneously. A debug facility enables you to fix errant code on the spot. The program is enriched by a web of error messages and multiple levels of on-line help, and will even work with DOS machines that veer from strict PC compatibility. WordTech, P.O. Box 1747, Orinda, CA 94563; 415/254-0900.

Spreadsheet Grammar

A picture may be worth a thousand words, but a spreadsheet often requires at least that many just to drive its numerical point home. With a nod to those who need to plug spreadsheet ranges into documents—and then continue tinkering with that portion of the model—Lifetree Software

(continues)



When it comes to preparing mailing labels, WordTech's dBXL provides a nice visual assist.

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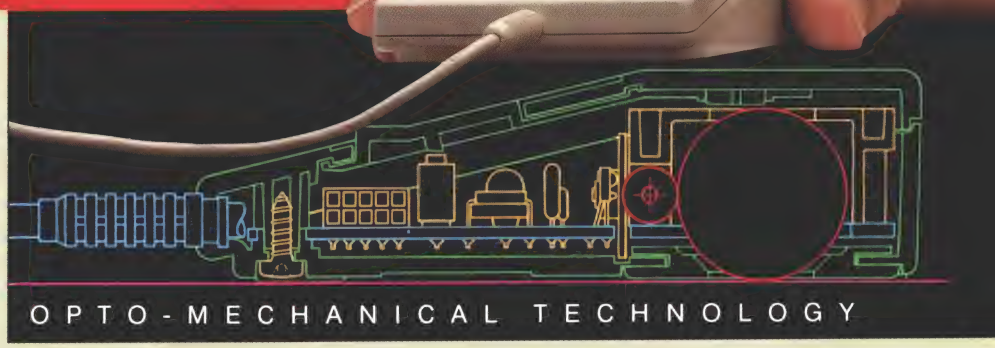

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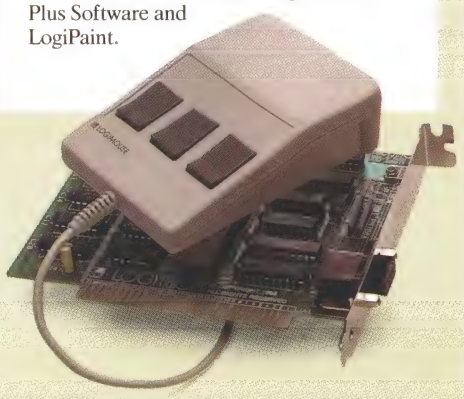

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Circle 598 on reader service card

```
READY                Page: 2    Line: 42
E11:    (C0) @SUM(B11..D11)
```

size of the spreadsheet window, you can also change the specific rows it reveals in your document. Move the cursor into the spreadsheet window below, and press the Scroll Lock key. Then watch the rows of spreadsheet scroll when you try to move the cursor up or down past the edge of the window. Try it. Also try scrolling to the right.
(Press Scroll Lock again when you are done.)

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Sales Allowance	$20	$80	$60	$160
Net Sales	$91	$119	$245	$455
Cost of Goods Sold	$30	$60	$70	$160
Gross Margin	$61	$59	$175	$295
Marketing/G&A Expenses	$35	$30	$30	$95
EBIT	$26	$29	$145	$200
Interest	$1	$2	$2	$5
Taxes	$7	$14	$19	$40
Net Income	$18	$13	$124	$155

In moving from the Words & Figures text environment to the spreadsheet, the cursor automatically becomes a cell pointer.

has unveiled ◆***Words & Figures.***

At $195, *Words & Figures* is a faithful rendering of *1-2-3*, with a modest word processor in tow. The program may be ideal for those who find cell annotation utilities inadequate and integrated packages overmuch. Lifetree has managed to fuse the two software genres without mixing metaphors.

The *Words & Figures* spreadsheet and word processor coexist. A split-screen feature displays both simultaneously; in moving from text to the spreadsheet, the cursor automatically becomes a cell pointer. The word processor follows *1-2-3*-like commands and hosts a "view port" into which you can capture a live worksheet. You can scroll around it, expand it, contract it, and return it to whence it came. The spreadsheet-in-text can also be frozen as an ASCII file and then edited.

The *Words & Figures* spreadsheet borrows liberally from both *1-2-3* release 1A and release 2. Measuring a hefty 9999 rows by 256 columns, the spreadsheet follows 1A keystrokes to the letter, accepts *1-2-3* macros and .WKS files, and mimics 1A graphics features. Like release 2, *Words & Figures* supports hidden cells, column widths of up to 127 spaces, transposition of ranges, a pop-up list of range names, a sparse matrix orientation, expanded memory, and a numeric coprocessor. Lifetree has also tossed in a PostScript driver, an ability to sort data on three keys, and an audit trail option that flags a circular reference and identifies its source.

The word processor is functional rather than flashy; it supports word wrap, block moves and deletes, on-screen boldfacing and underlining, headers and footers, and a search-and-replace function. Lifetree Software, 411 Pacific St., Monterey, CA 93940; 408/373-4718.

Less Money to Manage?

As the elves of the House Ways and Means Committee wrap up their overhaul of the federal tax code, MECA has refurbished ◆***Andrew Tobias' Managing Your Money.*** Tobias, that entertaining oracle of financial sagacity, is back with tax planning guidance to see you through the next three murky years. The program contains the regulations and tax brackets for 1986 to 1988, and lets you flip among them to best gauge the damage.

Chase Manhattan customers can use version 3.0 for home banking. The Chase service provides stock quotes, account advice, tax preparation assistance, and, of course, support for on-line banking transactions.

Even users who don't bank with Chase are sure to appreciate MECA's decision to beef up the program's notoriously taciturn documentation. In addition, the *Managing Your Money* notepad is now a ubiquitous part of the program, capable of showing up anywhere. MECA has also streamlined the handling of mortgage

(continues)

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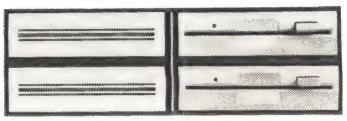

You can configure the Business Partners to your own individual needs. In addition to their built-in disk drives, you can add a hard disk drive, additional half-height drives—even a magnetic tape drive.

SPEED, PERFORMANCE, POWER, AND FUTURE GROWTH.

Both Business Partners are fast and powerful. The Business Partner 286, with its 80286 processor runs at 6 MHz or 8 MHz and can address up to 15Mb RAM. And as your business grows, so do your Business Partners. They have expansion slots for all the graphics, communications accessories and peripherals you're likely to need.

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The deluxe, detachable keyboards have been designed for comfort and ease of use. And we've separated the cursor keys and numeric keys for quick, convenient access.

SOME REASSURING LAST WORDS.

You'll find the Business Partner compatible with the IBM* PC/XT. And the Business Partner 286, with the PC/AT. So you'll be able to run the most popular software. You'll also get compatibility with Panasonic's wide range of quality peripherals. And just as important, both Business Partners are backed with Panasonic's one-year limited warranty.

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Company Name _____

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Or call: **1-800-PIC-8086.**

Panasonic Office Automation

PCW37

* IBM is a registered trademark of the International Business Machines Corp.

prepayments, made it possible to store analyses on multiple rental properties, and tweaked the program so it can print files in *1-2-3* format. *Managing Your Money* is priced at $199.95; current users can upgrade directly from MECA. 285 Riverside Ave., Westport, CT 06880; 203/222-1000.

Writing the Fine Print

Attorneys who can't get their word processors to accommodate the peculiarities of the legal profession may obtain some redress from the latest incarnation of ◆***WordPerfect.***

Requests from a pair of influential customers—the United States Department of Justice and the state of California—inspired version 4.2 of the popular word processor, giving the product a decidedly juridical cast. *WordPerfect* now comes complete with line numbering, the ability to generate a table of legal references, enhanced paragraph numbering, and a seven-level outliner.

Whatever your business, *WordPerfect*'s new document comment and summary functions should prove useful in preparing critical asides and document histories. You can generate exhaustive indexes via a concordance feature, which notes every occurrence of a word. In addition, the program now possesses a beefier 10,000-entry thesaurus, automatic timed backup, support for up to 24 columns (which can be snaked, newspaper-style) on a page, an Apple LaserWriter driver, and an on-line tutorial. And budding desktop publishers can use a document preview feature to peek at the fully formatted file. *WordPerfect* version 4.2 is priced at $495; you can upgrade from 4.1 for $35. WordPerfect Corp., 266 W. Center St., Orem, UT 84057; 801/227-4000.

Winner . . . by a NEC?

Forget the business about angels dancing on the head of a pin. The current barometer of the miraculous is how much functionality engineers can cram into a laptop computer.

If you need to travel but don't want to leave a shred of computing power behind, NEC's ◆**MultiSpeed** laptop might be your machine. Perhaps drawing on its experience with briefcase-size computers, NEC has loaded the 12-pound, $1995 unit with 512K of ROM for desktop utilities, including a communications program, an auto-dialer, an outliner, a filer, and a *WordStar*-like notepad with a 20,000-word dictionary.

Standard equipment on the MultiSpeed consists of a pair of 3½-inch floppies; 640K; the dual speed NEC V30—an 8086 workalike—that can cruise at 9.54 MHz as well as 4.77 MHz; a detachable supertwist liquid crystal display; and parallel, serial, floppy disk controller, and RGB ports. The machine boasts separate function key and numeric keypads, along with special help and pop-up window keys; the latter calls the applications in ROM. The MultiSpeed can run for 6 hours on a single battery charge; an optional 1200-bps modem costs $399. NEC Home Electronics, Computer Products Division, 1255 Michael Dr., Wood Dale, IL 60191-1094; 312/860-9500.

Just a Little Spark

If $2000 is beyond your budget for a traveling companion, Datavue is offering ◆**Spark,** a $995 unit with a single 3½-inch drive, 384K, a 25-line supertwist LCD, and an 80C88 CPU every bit as fast as the MultiSpeed's. The 9-pound laptop comes with the requisite serial, parallel, and video ports and can live for 8 hours away from a power outlet. For an extra $100, Spark's LCD will give way to a backlit screen. If you'd rather supply your own monitor in lieu of an LCD, Spark can be had for $749.

Should you decide to save on avoirdupois rather than cash, you may want to consider Datavue's ◆**Snap 1+1,** a 5-pound machine that alights on an expansion base that has all the trimmings. The Snap's lap module is equipped with an 80C88 processor; 512K; an 83-key keyboard; sockets for

(continues)

What's friendly, powerful and remembers everything about your 1-2-3 spreadsheets?

With Noteworthy, neither you nor others who use your spreadsheets need ever forget the true meaning of a cell.

It's a jungle in there.

Let's face it. Some of your spreadsheets can be real beasts-with tons of formulas, assumptions, and complex interrelations between cells.

It's tough enough trying to remember your own reasons for doing things. Worse yet, try explaining it all to someone else.

Introducing Noteworthy – The professional spreadsheet annotator.

Now, thanks to new Noteworthy,™ it's easy to tame the most gigantic spreadsheets in creation. That's because Noteworthy is the first software ever to combine a majestic power for spreadsheet annotation with a gentle, cooperative nature.

Plus, it works alongside 1-2-3® in a way that no software has ever done before.

Want to remember why you put what you put in a cell? Just hit the hot-key and up pops a blank note. Then type away using Noteworthy's powerful built-in editor (it will remind you a lot of a full-featured word processor).

Create single notes up to 8,000 characters long. Make as many notes as you need, in a window of any size you choose, positioned on the screen where you want. Copy text from your note to a spreadsheet. From your spreadsheet to a note. Or from one note to another. Find and replace words and phrases automatically, in single notes, or throughout the spreadsheet.

Noteworthy even reminds you where you put your notes. Each time the cursor lands on an annotated cell, the note indicator lights up at the bottom of the screen.

Big news for heavy 1-2-3 users.

Despite its awesome power, Noteworthy is fast and reliable. That's because it doesn't lumber along in the background like some RAM resident utility. Instead, it runs as a bona-fide 1-2-3 add-in. In fact, Noteworthy was specially developed using new software tools supplied by Lotus® themselves.

That means true integration between 1-2-3 and Noteworthy. No clumsy interference with the keyboard or with background programs like SideKick.® And it consumes less than 50K, which means it virtually runs on peanuts.

So why burden yourself with the details of your spreadsheets, or with annotation software that doesn't pull its weight? Just remember Noteworthy. And you can forget everything else.

Look for Noteworthy at computer dealers on several continents. Or avoid the stampede and order direct from Funk Software with your check, Visa or MasterCard.

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Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

To order call 1-800-822-3865

(617-497-6339 in MA)

Requires 1-2-3 Version 2 or Symphony.® Will **not** run with 1-2-3 Version 1 or 1A.

Funk Software, 222 Third Street, Cambridge, MA 02142

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Circle 92 on reader service card

ROM packs; plus serial, parallel, RGB, and composite ports. The unit can sport any of three supertwist 25-line LCDs. The base module contains either a 20MB hard disk and a single 3½-inch floppy or dual floppies, 640K, a floppy drive port, and one free half-slot for expansion. $2095 buys a Snap 1+1 with two floppies, 640K, and the basic blue supertwist LCD. Datavue Corp., One Meca Way, Norcross, GA 30093-2919; 404/564-5668.

Konica: Making Tracks

For hard disk users who lack a tape backup unit, the prospect of shuffling a score of floppies in and out of drive A: has been reason enough to postpone backup chores until Lucifer gets the chills.

Thanks to Konica, you needn't wait quite that long. The company may have made backup bearable again with its ◆**KT-510** 5¼-inch floppy drive—a half-height unit that can read and write 11MB on standard media. The KT-510 lays down a remarkable 480 tracks per inch—ten times the usual floppy disk density. The Konica drive boasts a form factor identical to that of your current Toshiba or Teac and connects to a PC, XT, or AT via a SCSI interface. And, eschewing obsolescence, the drive can also read conventional 360K and 1.2MB disks.

Although the Konica drive endows any floppy with the capacity of a hard drive, the KT-510 doesn't approach hard disk average access times. Konica is selling the unit, in OEM quantities, for $400. Konica Technology, 777 N. Pastoria Ave., Sunnyvale, CA 94086-2918; 408/773-9551.

A Better Mousetrap?

Tired of mice flitting across your desk? Can't abide having to move your arm in Ouija-board arcs to complete a simple menu selection? Keeping the cross hairs fixed in a desktop publishing or CAD application doesn't seem like much trouble until you're dealing in 1024-by-1024-pixel resolution or you need to manipulate an object on the *z*-axis.

That's where ◆**FastTRAP** comes in. It's a new kind of input device from Microspeed, a company best known for its Fast88 accelerator board. FastTRAP (Fast Tri-Axis Pointer) replaces a mouse or a trackball. It's a bona fide high-resolution three-dimensional input unit that eliminates the need to enter *z*-axis data from the keyboard. Consisting of a ball for two-dimensional movement, a finger-wheel for the third axis, and three buttons for mouse emulation, FastTRAP snuggles right up to the cursor keypad—and stays put. At 18 ounces, it possesses the mass needed to prevent jittery movement on screen.

A serial device, the $149 FastTRAP can track at a 45-degree angle and can even be adjusted for lower resolution if your job (or your hardware) doesn't call for pinpoint accuracy. Microspeed is on a campaign to encourage driver development; for now, the unit emulates all mice. Microspeed, Inc., 5307 Randall Pl., Fremont, CA 94538; 415/490-1403.

Behind Motorola's Mask

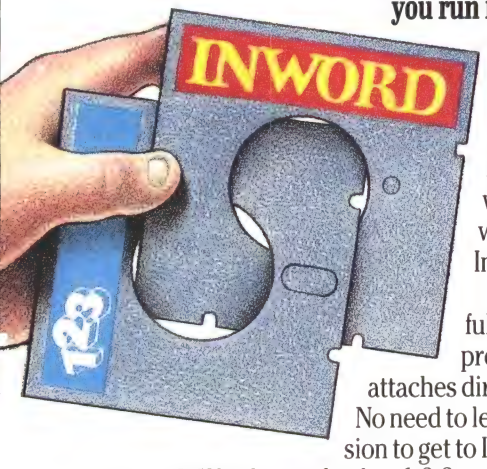
Although Intel has a firm grip on the office personal computer marketplace, it doesn't yet have big business in a hammerlock. If you've wistfully envisioned your favorite PC application showing up on that nearby Sun workstation, yearn no more. Phoenix Technologies, a BIOS factory, has developed the ◆***Soft Co-Processor,*** a software-only emulator for non-Intel CPUs and alien operating systems.

Written for systems with or without floppy disk controllers, the Soft Co-Processor tricks CPUs like the Motorola 68000 into running XT-compatible software and routes all I/O through the DOS emulator. The Soft Co-Processor even integrates the DOS file scheme with that of the host system. NEC, Apollo, Sun, Hewlett-Packard, and Convergent Technologies will reportedly be offering the product on an OEM basis. Phoenix Technologies, 320 Norwood Park S, Norwood, MA 02062; 617/769-7020.

(continues)

Now there's a real word processor that's just as attached to 1-2-3 as you are.

Introducing InWord. The complete word processor you run from inside 1-2-3.



Now, for everyone who's ever formed a meaningful relationship with 1-2-3,® we offer a single word of advice – InWord.™

It's the full-fledged, full-function word processor that attaches directly to Lotus 1-2-3. No need to leave your 1-2-3 session to get to InWord. No need to leave InWord to get back to 1-2-3.

Best of all, InWord works wonders with your words in the same way 1-2-3 helps master your math.

Take full command of the language.

InWord is equipped with the kind of speed and performance that anyone could fall for. You get automatic word wrap and paragraph reform, horizontal scrolling, search and replace, cut and paste, cursor movement by word, sentence or paragraph. And there's more.

You can format your document with headers, footers, page numbers, tab stops, indents, and hanging indents. As well as left, right, center and full justification.

Plus you can print bold, underlined and italic text, and mix typefonts and pitch to your heart's content.

InWord gives you instant spreadsheet integration, plus powerful formatting and typestyle controls.

It's great to be connected with Lotus.

It's no coincidence that InWord gets along so beautifully with 1-2-3. In fact, InWord was developed especially for 1-2-3 Version 2 using software tools supplied by Lotus® themselves.

That means InWord is truly integrated with 1-2-3. So it's a breeze to transfer data directly from a spreadsheet to a document, or the other way around. And a snap to do lightning-like mailmerge operations straight from your 1-2-3 spreadsheet database.

You can even hotwire parts of your spreadsheet directly into your document. So any changes you make to your spreadsheet are instantly reflected in your document.

Plus, InWord runs from a command menu that looks, acts and feels exactly like 1-2-3 itself. You just can't get more familiar than that.

So if you've become hopelessly attached to the 1-2-3 habit, insist on the one word processor that shares your affection. InWord. It's from the makers of Sideways, the world's leading 1-2-3 spreadsheet printing software.

With InWord, automatic mailmerge is as easy as selecting a range from your 1-2-3 spreadsheet database.

See InWord at better computer dealers everywhere. Or order direct from Funk Software with your check, Visa or MasterCard. At just $99.95 a copy, InWord could be the last word you'll ever need.

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To order call 1-800-822-3865

(617-497-6339 in MA)

Requires 1-2-3 Version 2. Will **not** run with Version 1 or 1A.

Funk Software, 222 Third Street, Cambridge, MA 02142

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Circle 25 on reader service card

Briefly Noted

The beauty of a monitor like NEC's MultiSync is its general obliviousness to the graphics board below. If you're running *Microsoft Windows* on a MultiSync, both Quadram's ◆**ProSync** and STB's ◆**EGA Multi Res** deliver crisp 752-by-410-pixel resolution—and effectively enable you to squeeze more data into that frame. If you've got *Windows* open on a standard EGA monitor, the STB board will bump resolution up to 832 by 350 pixels. Both boards come with *Windows* drivers, and Quadram's offering is equipped with an Autoselect feature that chooses the mode best suited for your active program. With the board, STB includes *PC Accelerator* print spooler and RAM disk software. Both boards support monochrome, Hercules, CGA, and EGA modes. Quadram Corp., One Quad Way, Norcross, GA 30093-2919; 404/923-6666. STB Systems, 1651 N. Glenville #210, Richardson, TX 75081; 214/234-8750.

◆◆◆◆◆

Power users who get the shakes at the thought of pulling their system's CPU—even to replace it with an 80386—might find Applied Reasoning's ◆**PC-Elevator 386** cause for relief. The firm's latest accelerator board gives you a 16-MHz 386 and lets you keep whatever else you're using as well. Unlike 386 plug-ins from Intel and Quadram, the PC-Elevator 386 simply fits in a slot and works alongside the original CPU, which continues to handle I/O chores. The $1995 board contains 1MB of 100-nanosecond RAM, expandable to 16MB using 1-megabit chips. Applied Reasoning, 80 Sherman St., Cambridge, MA 02140; 617/492-0700.

◆◆◆◆◆

If 30MB of hard disk storage on a board isn't copious or quick enough for your needs, Rodime has an answer. The U.K. firm is breaking into the board-mounted hard drive market in a big way; its ◆**R-Card 45** offers 45MB of lickety-split disk storage, with an average access time of 28 milliseconds. The R-Card 45 (or a similar 35MB offering) fits into any XT or compatible's long slot. If the motherboard isn't hospitable to the new addition, a connector can link the drive directly to the PC's power supply. Rodime's own software does an end run around the 32MB DOS limit. The R-Card 45 lists for $1495. Rodime, Inc., 29525 Chagrin Blvd. #214, Pepper Pike, OH 44122; 216/765-8414.

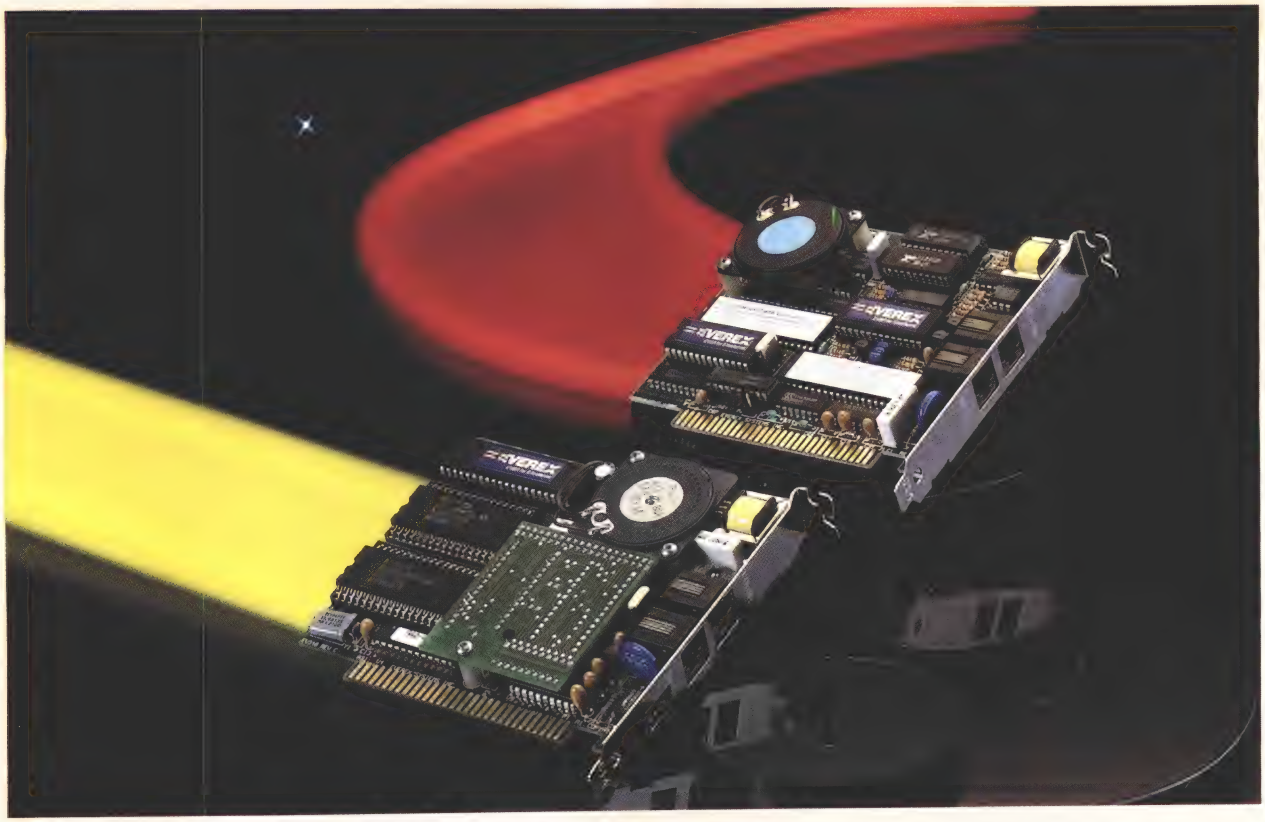
◆◆◆◆◆

Spreadsheet users who need to determine solutions based on specified goals—or who want to assign resources among various entities without unnecessary sweat—might lighten their work load with ◆***Silk,*** from Daybreak Technologies. The $149 spreadsheet—which is said to be "largely compatible" with *1-2-3*—moves the Lotus command line to the bottom of the screen and integrates such choice functions as goal-seeking and resource allocation into that command line. *Silk*'s talent for enabling you to define validation criteria (and thereby check data entry) is ideally suited to users building turnkey applications. Like Lotus's *HAL, Silk* accepts English-language formulas and includes a session transcript facility and an undo command. The program's "live" help follows you as you grope around the spreadsheet; *Silk* also offers hi/low/close/open graphs, along with a utility that reads and writes .WKS files. Daybreak Technologies, 2271 205th St. #103, Torrance, CA 90501; 213/212-3030.

◆◆◆◆◆

Even with a new addition to its portable computer family, Compaq is convinced there's still life in the desktop 286 business. If you're eyeing an AT compatible as a network file server, take a gander at Compaq's ◆**Deskpro Model 40.** The unit features the same fast-access 40MB hard disk drive that made its debut in the company's 386 machine. The addition of the drive—and its multipurpose fixed-disk controller—frees up a slot, making room for seven expansion boards. The Model 40, which lists for $4999, essentially replaces the 30MB Deskpro 286. The Model 40 is also equipped with a 101-key enhanced keyboard, 640K, a 1.2MB floppy, and room for three additional internal storage devices.

We Invite You to Compare...



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$289 2400 Baud LIST PRICE

Features	EVERCOM II 1200 Baud	Leading Edge Model "L"
★ Hayes* AT compatible	YES	YES
★ 300/1200 baud	YES	YES
★ SW VOL control	YES	NO
★ Runs in slot 8 of IBM XT*	YES	NO
★ Runs with all versions of Smartcom II*	YES	NO
★ ROM test on command	YES	NO
★ Simplex communication	YES	NO
★ Phone-off-hook detect	YES	NO
★ Auto voice-to-data switching	YES	NO
★ Format (speed & parity) ID on command	YES	NO
★ Speed Mismatch message	YES	NO
★ Works with call waiting	YES	NO

Features	EVERCOM 24 2400 Baud	Leading Edge Model "L"
★ Hayes* AT compatible	YES	YES
★ 300/1200/2400 baud	YES	YES
★ Runs in slot 8 of IBM XT*	YES	NO
★ Runs with all versions of Smartcom II*	YES	NO
★ Runs with multi-line phones	YES	NO
★ Phone-off-hook detect	YES	NO
★ Auto data-to-voice switching	YES	NO
★ Allows "at" in lower case	YES	NO
★ Format (speed & parity) ID on command	YES	NO
★ Speed Mismatch message	YES	NO
★ Adaptive dialing	YES	NO
★ Leased line operations	YES	NO
★ Programmable response to DTR	YES	NO
★ CCITT guard tones	YES	NO
★ Self-test (RDL)	YES	NO
★ Installation program	YES	NO

1-800-821-0806 1-800-821-0807 (in CA)

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Dealers circle 331 on reader service card
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From the Software Shelf

PC World offers first impressions of recent software releases

This month: painless consolidation, one-step graphics, getting the lead out of the cursor, the PC as timekeeper, wines on disk, and more

X-Y-Z:Consolidate

1-2-3 and Symphony worksheet-consolidation program
Pros: *Handles multiple worksheets; finds data regardless of location*
Cons: *None*
Version 2.2
Intex Solutions, Inc.
568 Washington St.
Wellesley, MA 02181
617/431-1063
List price: 12-worksheet version $145, 255-worksheet version $395
Requirements: 256K, two disk drives, DOS 2.00 or later version
Not copy protected

It's late Friday afternoon, and your boss calls you into her office. She wants total month-end sales figures, broken down by product. And she wants them in 20 minutes.

As national sales manager, you're responsible for the performance of your company's products in ten regions. As you stare at a stack of disks—one from each of your regional sales managers—panic sets in. Each disk contains a *1-2-3* worksheet with sales data for a single region. Each worksheet is large; you can't load them all into memory at once.

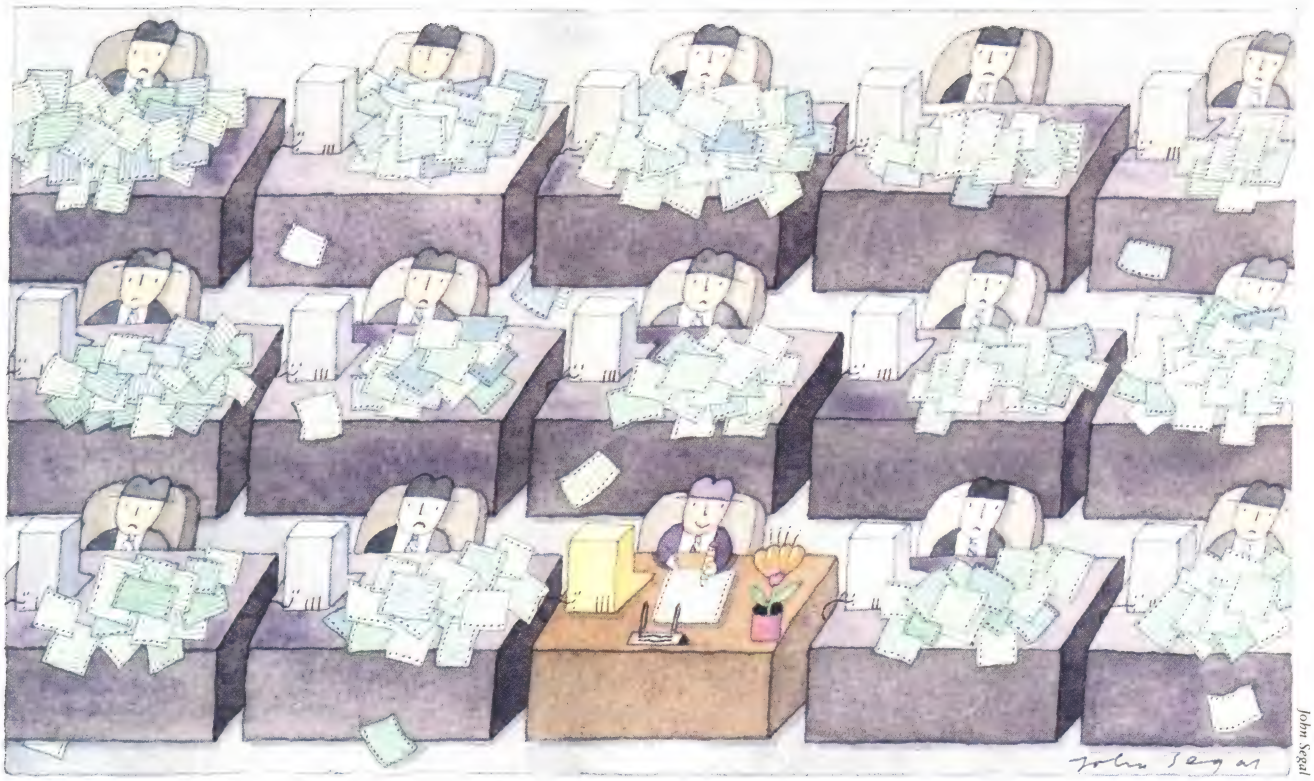
After spending the first 10 minutes fretting over an about-to-be-missed deadline, most of us would probably fire up *1-2-3*, sequentially load each worksheet, and manually add up the appropriate data—an error-prone and embarrassingly inefficient approach. And when the 20 minutes expired, we'd probably still be plugging away.

That scenario typifies one of *1-2-3*'s particularly nagging problems: its inability to link multiple worksheets. If you have data stored in several worksheet files, often you can only consolidate it through a slow and tedious manual process.

Until now, that is. *X-Y-Z:Consolidate* is a stand-alone program that can read up to 255 worksheet files produced by any version of *1-2-3* and *Symphony* and consolidate selected information into a new worksheet. With *X-Y-Z:Consolidate* on a hard disk, the mythical sales manager's task becomes a piece of cake. A few quick commands will create a new worksheet that contains the information on which the manager's fate depends.

Those attuned to *1-2-3*'s more esoteric commands may be reminded of the program's /File Combine Add command, which lets you add cell values from another worksheet to the overlapped cells in the worksheet in memory. While this command may do the trick in some situations, it's quite limited, because the worksheets or ranges to be added together must be identically laid out.

What makes *X-Y-Z:Consolidate* particularly appealing is its ability to find the desired information in a worksheet, regardless of the data's location. In other words, the source worksheets need not have carbon copy formats; the program handles layout variations surprisingly well. For example, if you're consolidating budget worksheets across departments, all the



departments' row names (such as Budget Items) needn't be in the same order. In fact, each worksheet doesn't even have to contain all the row names; the program will consolidate only those rows that match the master worksheet.

Summing cell values across a stack of spreadsheets is just one of the mathematical functions that are available with *X-Y-Z:Consolidate*. You can request other operations such as average, count, minimum, maximum, and even weighted averages and standard deviations. And if the need arises, you can specify different consolidation options for different parts of the spreadsheets.

Another *X-Y-Z:Consolidate* feature lets you select rows from separate worksheets and dump them into a new worksheet. Row slicing, as it's called, is useful when you want to work with a particular line item that's common to several different worksheets (such as revenue entries from each of ten sales offices). An analogous operation—column slicing—is also available.

X-Y-Z:Consolidate's error handling is impressive. It detects cells with missing data or @ERR and @NA messages and politely warns you so your output file won't contain any surprises. It even adjusts the count so missing data won't skew the averages.

X-Y-Z:Consolidate's simple menus prompt you through the consolidation process. The program also produces an ASCII file record of your actions. The file records your menu choices, the names of the files processed, and any errors discovered during consolidation. Besides functioning as an audit trail, this ASCII file doubles as an input file the next time you perform the same consolidation—a real time-saver if you regularly process a batch of spreadsheets.

If all this sounds complicated, don't despair. An on-line tutorial introduces you to most of the product's features, and help is but a keystroke away. The well-organized manual spells out the details of the program clearly and succinctly. And you needn't worry about doing any damage—your original files remain intact.

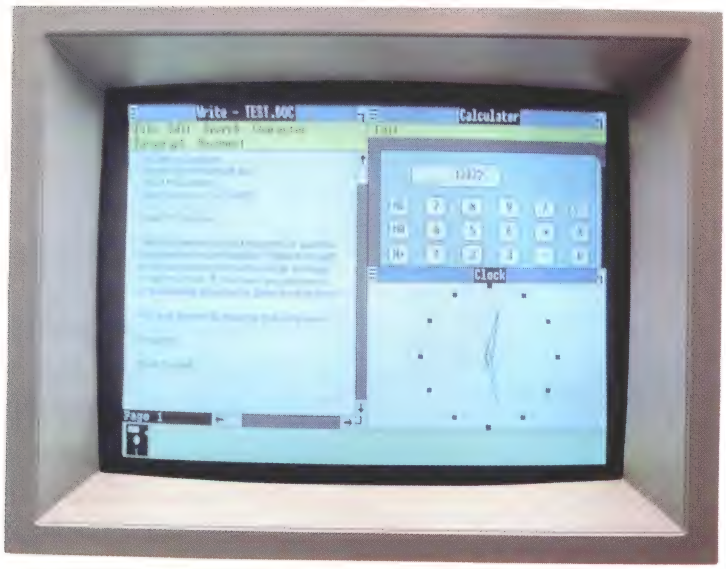
If you use several different worksheets and need to consolidate their data, *X-Y-Z:Consolidate* automates the process. It's available in two versions that differ only in the number of files they can process (12 and 255). To top it off, the latest version of the program is not copy protected, and its

(continues)

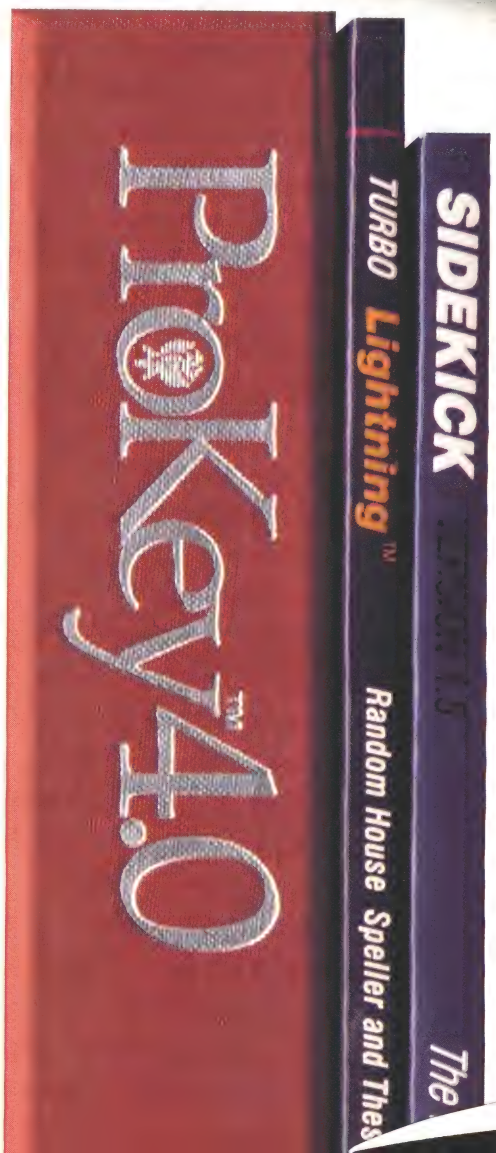
The me
always the

–192K RAM. For all its pluses, networking has a minus.

–66K RAM, –128K RAM, –128K RAM. A word of warning: Too many pop-ups can have a negative effect on your memory.



–320K RAM. Windowing can give you a whole new outlook. It can also gobble up a whole lot of memory.



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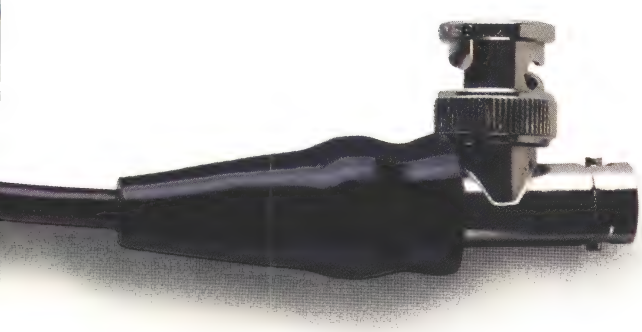
mory is first to go.



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compatibility with Turner Hall's *SQZ* version 1.5 means you can work with compressed files.
–John Walkenbach

Chart-Master

Business graphics program
Pros: *Easy to use, supports several data formats, outputs to numerous printers and plotters*
Cons: *Imported data must be in tabular format*
Decision Resources, Inc.
25 Sylvan Rd.
Westport, CT 06880
203/222-1974
List price: $375
Requirements: 256K, two disk drives, DOS 2.00 or later version; hard disk and graphics display adapter recommended
Copy protected

Sign-Master

Sign-making presentation program
Pros: *Easy to use, allows some global edits*
Cons: *No-frills output*
List price: $245
Requirements: 256K, two disk drives, DOS 2.00 or later version; hard disk and graphics display adapter recommended
Copy protected

Diagram-Master

Chart- and diagram-drawing program
Pros: *Includes clip art image library*
Cons: *Lacks global editing functions*
List price: $345
Requirements: 384K, two disk drives (hard disk recommended), color graphics adapter or monochrome graphics display adapter, DOS 2.00 or later version
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If a picture is worth a thousand words, what's the price of a graph, an organizational chart, or a sign? At least $375, $345, and $245 respectively, according to Decision Resources, whose *Chart-Master, Sign-Master,* and *Diagram-Master* are three of the most popular presentation graphics programs on the market. *Chart-Master,* in fact, tied *Microsoft Chart* for first-place kudos in the presentation graphics category of *PC World*'s 1986 World Class PC awards.

Along with *Map-Master* (see "Mapping Strategies," *PCW,* October 1986), these programs take a no-hassle approach to solving the presentation business graphics needs of deadline-driven users. The relationship among *Chart-Master, Sign-Master,* and *Diagram-Master* is familial rather than *image à trois.* The three programs can't share files and aren't designed to work as an integrated graphics system. Decision Resources apparently feels that in corporations where users at different levels of PC expertise need to produce graphics in a hurry, integration isn't key.

Consequently, the company has opted to keep things simple. The *Master* programs share a menu style, use many of the same commands and editing conventions, employ identical installation procedures, and are equally easy to use in generating graphs, signs, and diagrams. For example, I produced a variety of full-color bar graphs and pie charts with *Chart-Master* in 30 minutes–without opening the manual.

Of the three, *Chart-Master* is perhaps the most utilitarian. It graphs data in seven basic formats: clustered bar charts, stacked bar charts, line charts, scatter charts, area charts, pie charts, and a mixed chart that combines a line chart with either a stacked or a clustered bar chart. *Chart-Master* can also plot stacked and clustered bars horizontally and explode several slices in a pie chart.

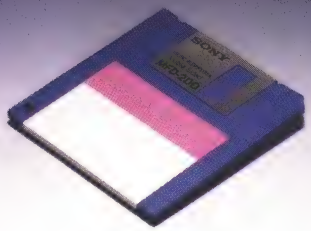
The first time you use *Chart-Master,* a series of screens guides you through the system configuration. From then on, just type CM to display the main menu.

Eight main menu selections provide access to all *Chart-Master* functions. Choose 'Create a Chart' and the program leads you through the graph-creation process, asking for titles, *x*- and *y*-axis labels, the number of observations and variables, observation and variable labels, and data. You can preview a graph on screen (saving time and paper) and then

(continues)

The inventors of the 3.5″ drive recommend only one floppy disk

Theirs.



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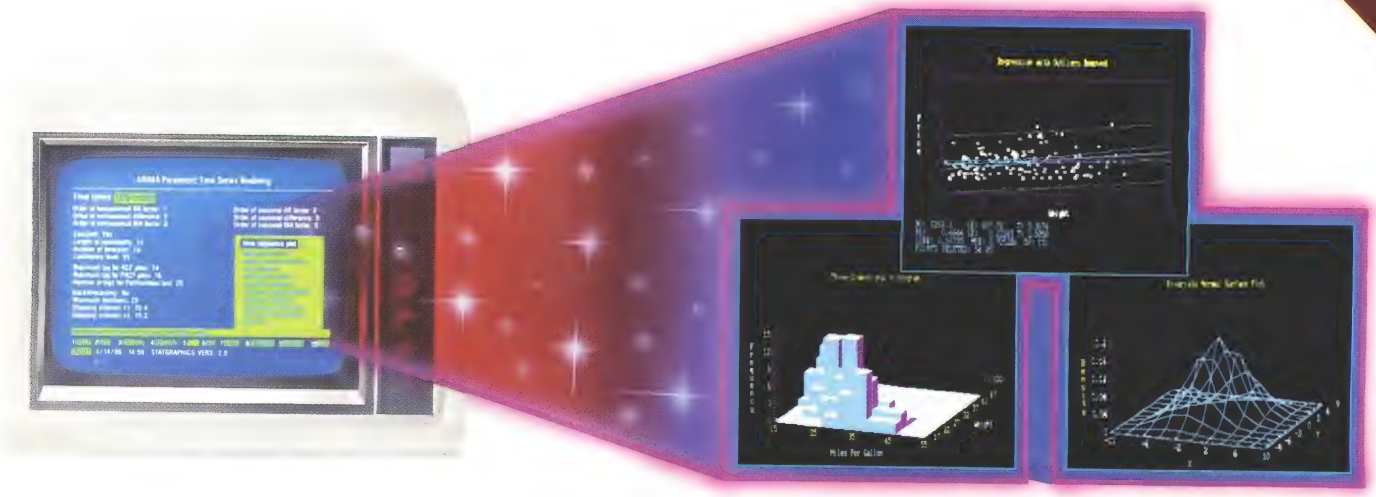

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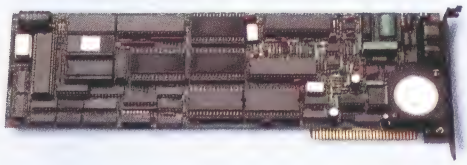

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print it out with a single keystroke. If you want to spruce up a chart, you can choose from 8 different fonts (including a 94-symbol font), 16 type sizes, italics, and 8 cross-hatch patterns.

Chart-Master has its own file import feature—DataGrabber—which makes collecting data in DIF, SYLK, and ASCII formats a painless affair. For example, to graph a *1-2-3* worksheet, you simply select DataGrabber from the main menu, load the worksheet in question, highlight the data using the cursor keys, press <Enter>, and watch as DataGrabber pours the numbers into *Chart-Master.* At this point you can edit the data to your liking and, with a single keystroke, direct the program to spit out a graph (see Figure 1).

Switching from one chart type to another is a matter of choosing the chart type from a menu. DataGrabber, however, has some limitations: It can't import data from files outside of *Chart-Master*'s subdirectory, and data must be stored in a row-and-column format.

Like the other *Master* programs, *Chart-Master* aims to please. If you try to print a graph and there isn't enough memory to go around, *Chart-Master* shrinks the graph to fit the available RAM. If you select too large a type size for the image, *Chart-Master* asks permission to substitute a smaller size. No matter what rules you try to break, the program compensates. That doesn't mean you're always hemmed in; although *Chart-Master* has defaults for chart placement, you can override them and position several charts on one page.

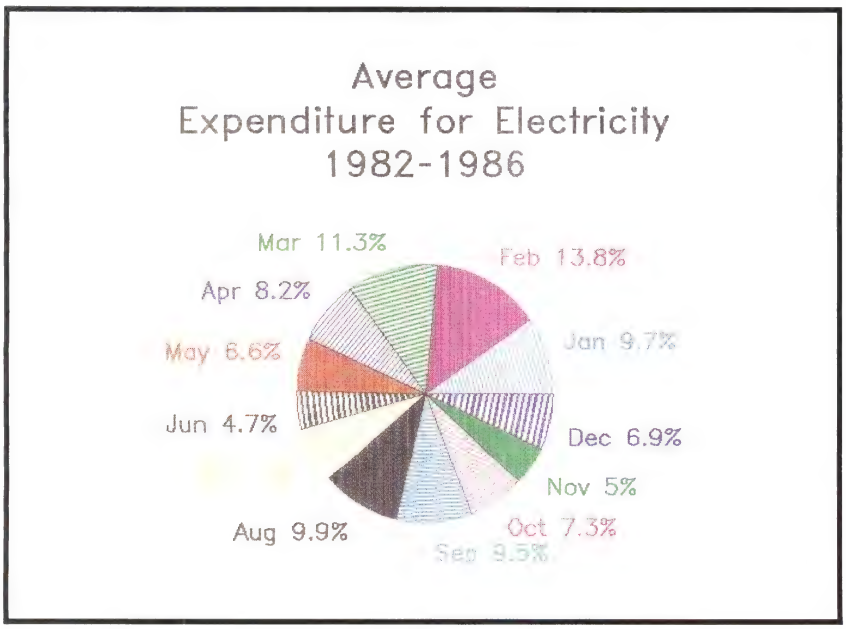

Figure 1: Chart-Master won't win any design awards, but you can produce workaday business graphics with but a few keystrokes.

For power users there's even a batch function that allows you to store DataGrabber parameters, command sequences, and plotting options to automate data collection and plotting.

Of course, sometimes you need to shout your message to the world—or at least to a gathering of the board—and that's when you turn to *Sign-Master.* As its name suggests, the program enables you to lay out basic presentation-quality tables, headlines, and other miscellaneous text charts.

As with *Chart-Master,* all *Sign-Master* functions can be plucked from a main menu, and the program guides you every step of the way. With a little effort and a Xerox 4045 laser printer, I created a professional-looking financial summary that any CEO could readily present to shareholders (see Figure 2).

Sign-Master offers a number of features, including 6 fonts (one with 94 symbols), 16 type sizes, support for 8 colors and for italics, and the ability to output text in landscape or portrait orientation. If you need to scale text or convert several lines from one type style to another, you can make the changes piecemeal or globally. You can also specify black and a single color or switch from multiple colors to a single color with a few quick menu selections.

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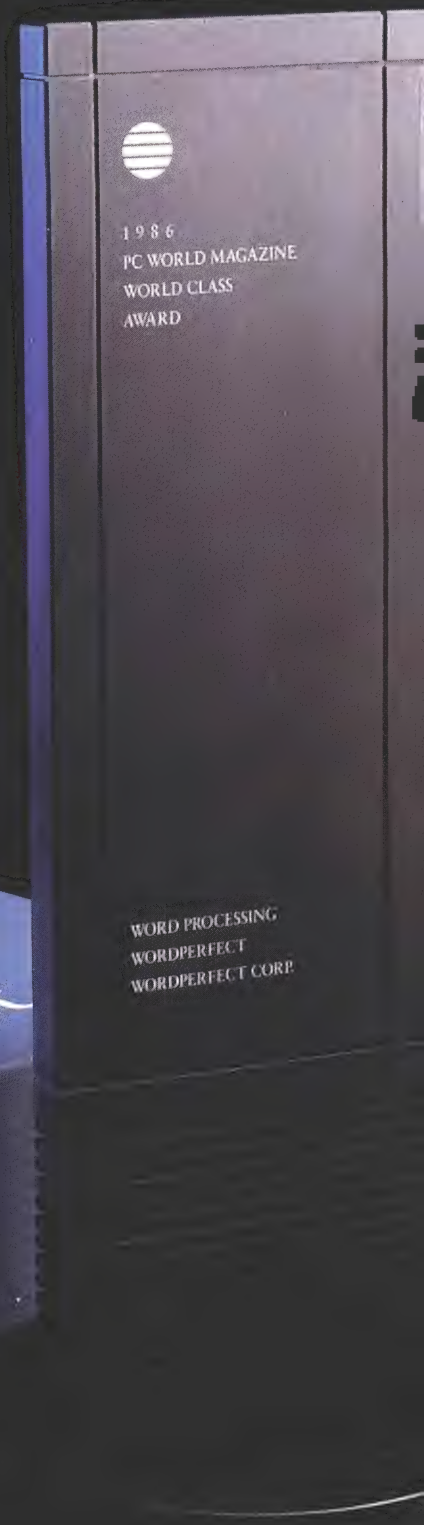

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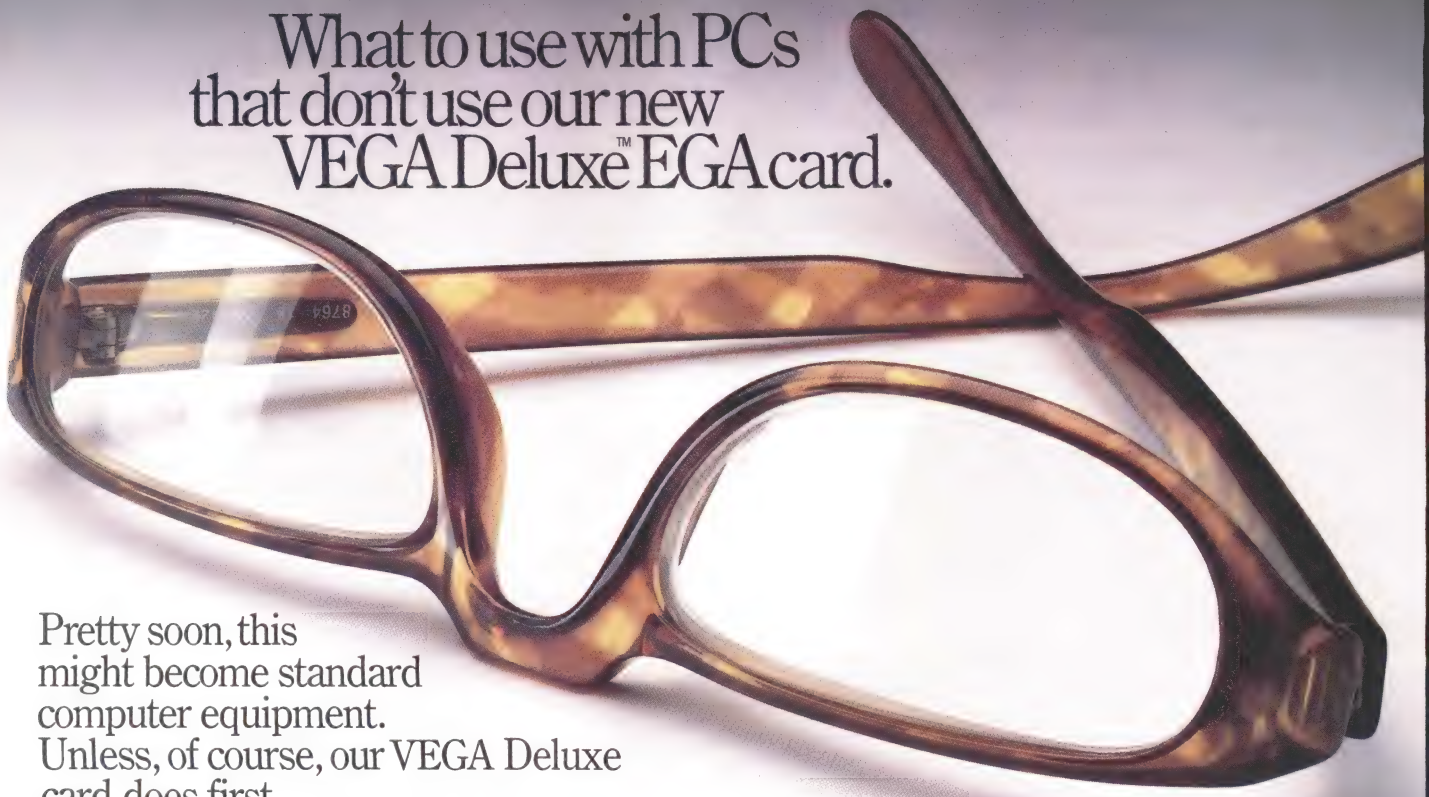

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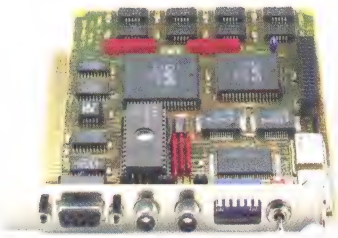

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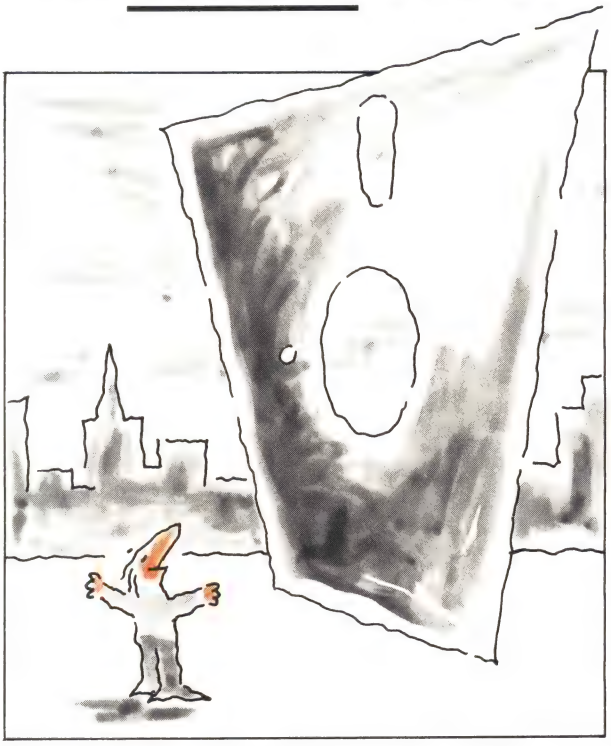

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Income Statement	
Net Sales	$ 9,942,000
CGS & Operating Expense	9,408,000
Income from Operations	$ 534,000
Other Expense	60,000
Income Before Taxes	$ 474,000
Provision for Taxes	228,000
Net Income	$ 246,000

Balance Sheet			
Assets		Liabilities	
Cash	$ 298	A/P	$ 464
A/R	965	Taxes	204
Inventories	493	Other	161
Other	17	Total	$ 829
Total Current	$1773	Debt (L/T)	14
Plant & Equipment	265	Equity	1195
Total	$2038		$2038

Figure 2: Sign-Master generates more than happy birthday signs—a financial statement for the boss can include multiple fonts, and other niceties.

If you've ever tried mixing type styles and sizes on a single line with a word processing program, you know that the results are usually disastrous—margins skew and centered text shifts. *Sign-Master* centers and justifies text properly, no matter how many sizes and type styles occupy the same line or page. Slick indeed, especially for a no-frills sign-making program.

Equally simple but nonetheless utilitarian is *Diagram-Master,* which spares you from manually drawing organization charts, personnel flowcharts, and the like. Aside from delivering the basic goods, the program includes a Drawing Board feature and a library of 100 clip art images, which add a little spice to otherwise mundane diagrams.

Although menu-driven like its Decision Resources brethren, *Diagram-Master* is the least accommodating of the three *Master* products. Creating a simple organization chart isn't a great chore, but I discovered that the program refused to work with the supported Epson HI-80 plotter. The Xerox 4045 laser printer I tried next produced boxes and borders that were too faint. Since *Diagram-Master* lacks a global command for changing line weights, I ended up editing each box and border individually.

But *Diagram-Master*'s recalcitrance doesn't alter my overall impression of the *Master* series. The trio allows new and busy users to generate presentation graphics with minimal hassle and expense.

Each program could stand some additional global commands for editing type styles, type size, and line weights. But considering the likely user for the series, the programs' biggest need is an undo command. Even graphics pros will occasionally make a boo-boo, and reverse gear is definitely called for.

I certainly can't complain about display and output support. All three programs support the Hercules Graphics Card and the IBM Color/Graphics Adapter. *Chart-Master* and *Sign-Master* also take advantage of the Enhanced Graphics and Professional Graphics adapters, as well as the IBM Monochrome Display Adapter (although you lose on-screen preview with the latter). At print time you can choose from scores of graphics dot matrix printers, laser printers, color printers, plotters, and exotic devices like the Polaroid Palette and, in the case of *Diagram-Master,* General Parametrics' VideoShow.

Although some may feel the lack of integration a drawback, I found it less of a problem than anticipated. Had Decision Resources combined all three products into a single package, it would have been too complicated to use without hours of study. As the series stands, each program does a few things well with a minimum of user effort. *—Donald B. Trivette*

(continues)

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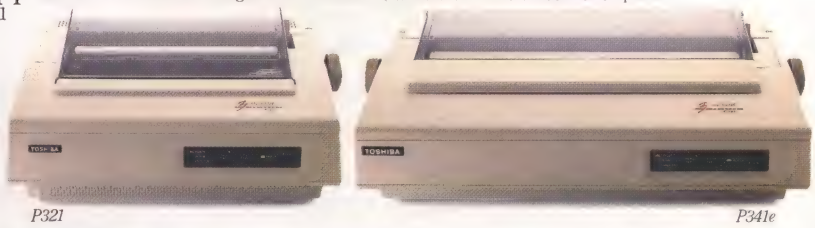
1. IBM PC is a registered trademark of International Business Machines Corporation.



P321 P341e

In Touch with Tomorrow

TOSHIBA

Toshiba America, Inc., Information Systems Division

Read It And Reap.

TO: Anyone who wants to improve their writing.

FROM: Ken Dickens, ad writer.

RE: A great new product, a helpful booklet, and how to get both of these ABSOLUTELY FREE.

I'm a skeptic. So when Reference Software told me Grammatik II could make my writing better (not just easier or faster, but "better") I grimaced. I thought, yeah sure, if it was real good it might help business people write better letters and memos. But I write ads. So if a software program can make my writing better, it's fantastic. And I'm not.

Well, two months and a whole bunch of humble pie later I'm here to tell you about Grammatik II, The Writing Analyst. Believe me, it's like an editorial assistant in a box. Grammatik can not check all your spelling or diagram a sentence, but Reference Software guarantees (and I can personally verify) that it will make your writing clearer and more concise the very first time you use it.

Just give Grammatik II your document's name and let it go to work. As it checks your writing against a comprehensive set of grammar and style rules, it stops if it suspects a problem. Then, right on your screen, the problem is shown in context along with a suggestion to go make the writing better.

For example, it might stop on a sentence like "I feel I should have won the Grammatik II contest", tell you that "feel" is probably incorrect and suggest "think" instead. You can ignore the suggestion and move on (calling this your writing style), or mark the problem to be edited later. Grammatik never, never automatically fixes anything for you. It's a coach, not a dictator.

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So what's it done for me? Nothing short of making my writing better. And the more I write right, the clearer and more concise it gets. Anyway, I'm happy to report that I now write at the 6th grade level (85% on Grammatik's readability index), I almost never write in passive voice (less than 2%), yet I still split lots of infinitives. And I always start too many sentences with and. But that's just my style.

Ken Dickens

CAPITALIZATION ERROR, ONLY 16 TO GO, GOOD LUCK

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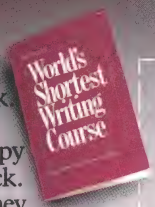

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Circle 114 on reader service card

Cruise Control

Cursor speed-up utility
Pros: *Cursor does not run on after key is released*
Cons: *Does not speed up WordStar cursor*
Revolution Software, Inc.
715 Rt. 10 E
Randolph, NJ 07869
201/366-4445
Requirements: 5K, one disk drive, DOS 2.00 or later version
List price: $29.95
Not copy protected

It's one of the ironies of the personal computer age. While vendors spend countless dollars squeezing every last ounce of speed out of their products, they overlook one of the biggest productivity bottlenecks—the humble (and sluggish) cursor.

IBM designed the PC's keyboard with novice typists in mind and set the keyboard's microchip to wait half a second before repeating a keystroke at a pedestrian 9 times per second. (The AT keyboard's repetition rate can be altered, but only within relatively conservative limits.) While this stately pace may reassure newcomers, it's hardly popular with experienced users who have better things to do than watch the cursor waddle to the end of a line.

Past attempts to solve cursor creep have not met with much success, since most of the utilities (typically found on electronic bulletin boards) can't prevent fatal cursor "run-on." Instead of hitting the brakes when a key is released, the cursor continues to skid across the screen. The problem results from the cursor accelerating beyond an application's control.

As you may have guessed, *Cruise Control* from Revolution Software puts your cursor into high gear and lets you stop it on a dime. *Cruise Control* manages this little trick by gauging how quickly an application can process keystrokes and increasing cursor speed accordingly. Depending on your application, the speed increase will be either heartening or just short of revelatory.

When you load *Cruise Control* at the DOS prompt or via a batch file, you must specify a control parameter or strategy. Stategy A works with most software; strategy B is aimed at *Microsoft Word, WordPerfect, Symphony,* and other programs that supply their own keyboard routines. Strategy C is designed for programs with roots in the CP/M world, such as *WordStar.* If your application doesn't respond, you can resort to strategy D, which removes the utility's braking mechanism altogether. You can further hasten or retard cursor speed within an application by simultaneously pressing 5 on the numeric keypad and <GrayPlus> or <GrayMinus>.

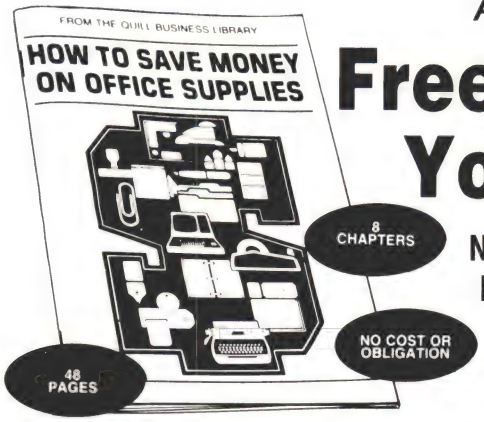
How well *Cruise Control* performs is largely a function of the program it's serving. In *Word* and *1-2-3,* the cursor scoots across the screen in double time; however, *WordStar*'s maximum keystroke rate is so phlegmatic that *Cruise Control* can't boost cursor speed without causing run-on. If you can can live with a fast and loose cursor, you can take your chances with strategy D. *Cruise Control* works uncomplainingly with *Microsoft Windows* and other operating environments, although you must change control strategies on the fly (by pressing <Ctrl>-<Tab>) whenever you switch to a new program.

At $29.95, *Cruise Control* would be a deal for the cursor acceleration alone. But in true value-added fashion, Revolution Software throws in a date and time stamp and an automatic screen blanker that can be set from 1 to 60 minutes. You can also dim the screen at any time by pressing 5-<Del>.

But by far the handiest extra is *Cruise Control*'s repeat function. For example, with <NumLock> off, press 5, release the key, and press <PgDn>, and *Cruise Control* will automatically flip swiftly through a document, a worksheet, or a passel of data base records until you touch another key. You can speed up or slow paging by pressing <GrayPlus> or <GrayMinus>.

Cruise Control is convenient and painless to learn, and it needs only a tincture of memory. Although it doesn't make your computer run any faster, it's one of the cheapest ways around to speed up your work. *—Patrick Marshall*

(continues)



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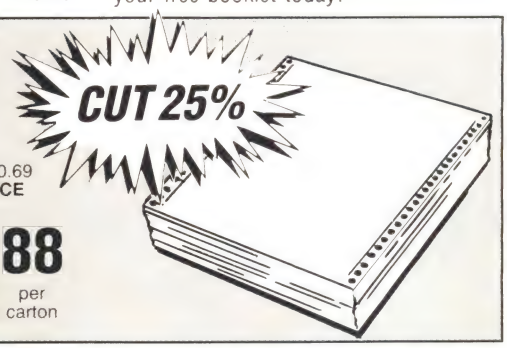

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The Fortyone

HP-41 calculator emulator
Pros: *Runs thousands of HP-41 programs*
Cons: *Limited to programming with HP-41 procedures*
Straightforward
15000 Halldale Ave. #115
Gardena, CA 90247
800/553-3332, 800/237-9680
List price: $115, Button Pacs $45 each
Requirements: 128K, one disk drive, DOS 2.10 or later version
Not copy protected

For the long-suffering engineer who charges into the field with a trusty HP-41 pocket calculator only to return to an office PC that doesn't speak the same language, relief is just an emulator away. Straightforward's *The Fortyone* runs HP-41 programs unchanged on a PC at warp speed. Although the program doesn't take full advantage of the PC's programming environment, it does turn the computer into the biggest HP calculator you ever saw.

My first computer was an HP-41C. That pocket-size programmable device held hundreds of lines of code and performed all the engineering and investment calculations I needed as a supervisor at Wang Laboratories.

A few years later I graduated to a PC, and my faithful HP-41 suddenly seemed very slow; after a session with BASIC and MS-DOS, it felt like some prehistoric tool, and reverting to Reverse Polish Notation each time I went back to the HP-41 was agony. The magic was gone, but some vestigial affection lingered. I missed the many HP-41 programs I'd written, not to mention the 5000 programs available from the HP user group.

Well, thanks to *The Fortyone*, I can now happily use the HP-41 and the PC in tandem. The program displays a spitting image of the 41's keyboard, provides all of the HP-41's built-in functions and programming capabilities, and, naturally, can use any programs written for the calculator (see Screen 1).

Straightforward has taken the most popular HP-41 programs and turned them into what it calls buttons. Each "Button Pac" includes 10 to 15 programs devoted to statistical functions, engineering calculations, and so on. Unlike its hand-held inspiration, however, *The Fortyone* can display schematics and similar bare-bones images (see Screen 2). As you might expect, the programs run 30 times faster on a PC; pop in an 8087 math coprocessor, and execution jumps by a factor of three.

If you're an HP-41 vet, using *The Fortyone* is a cinch. Just highlight a program name listed on the left side of the screen, and a brief description appears. Press <Enter> to load the program, and you get complete instructions and a list of all equations used. From then on, you follow HP-41 procedures; you even use HP documentation.

Like asparagus, *The Fortyone* isn't for everyone. If you grew up on Texas Instruments calculators and algebraic notation, go in peace: This program is for the legion of die-hard HP fans.

(continues)

```
Fkeys: 1HELP  2OFF  3SHIFT  4CHS  5USER  6EEX  7PRGM  8SST  9ALPHA  10R/S
Press the [KEY] corresponding to the FUNction desired          HP41E 0

                                  2469135780  ▮

X   2469135780
Y  123456789.1
Z       0.0000
T       0.0000
L   1234567890

F1 HELP   F2 OFF
F3 SHIFT  F4 CHS
F5 USER   F6 EEX
F7 PRGM   F8 SST
F9 ALPHA  F10 R/S

 Σ+   1/X   ↓   LOG   LN  ISG  RTN
 Q    W     E    R    T   Y    U

X<>Y RDN  SIN  COS  TAN  X<>_ VIEW
 A   S    D    F    G    H    J

SHIFT XEQ  STO  RCL  SST  FS?C FC?
 Z    X    C    V    B    N    M

The numbers and + - * /. are themselves
```

Screen 1: If you like the trusty HP-41, you'll like Straightforward's PC equivalent. To the right is a representation of the HP-41 keyboard; to the left, numbers in the program's stack and a listing of function-key assignments.

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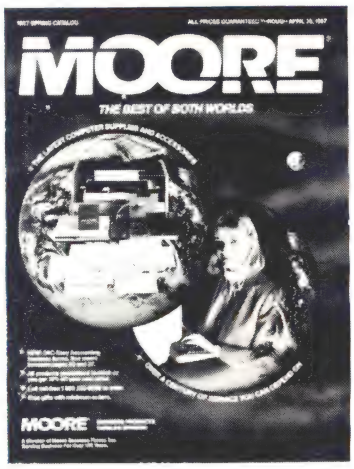

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```
UpArrow, DownArrow, [PgUp], [PgDn] for more - [Esc] to continue

C5 = C                    C2 = 4C(A + 1)/α²

R1 = α/4πfoC(A + 1)       R4 = AR1

R3 = α/4πfoC(A + 1) = R1A/(A + 1)
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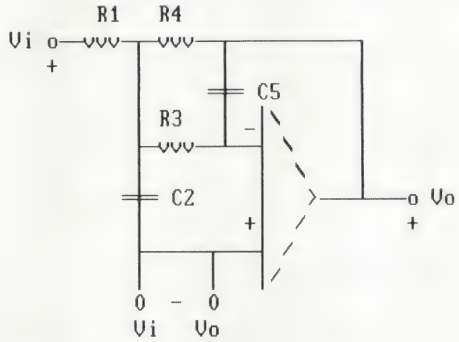


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Representation of a Low Pass Filter Schematic
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Screen 2: The Fortyone handles more than numbers—it can even display an engineering schematic.

Straightforward is trying hard to please them. The company is documenting a function that allows *The Fortyone* to compile a program from text files, and is working on software to ease direct data transfers between the HP-41 and the PC. Until now, if you wanted to use a custom program, you had to type it in. Adding a hardware module, called an HP82973-A Link card, to the HP-41 allowed some transfers, but not all. Straightforward claims that the combination of its new software and the link card will enable you to transfer both data and programs in either direction.

The Fortyone comes in three flavors: a standard version with 6-digit accuracy, a slower 9-digit version, and a much faster 8087 version with 12-digit precision. All include 160 built-in HP-41cv functions, 320 data registers, and 16,000 program steps. Since all three versions match or far exceed the HP-41's maximum capacity, what you have is one powerful—and cheap—HP-41. *—John McCormick*

Logger

Computer timekeeping program
Pros: Unobtrusive and automatic
Cons: Soaks up too much disk space
Release 2.0

(continues)

The Kitchen Sync.

Let's face it, most personal computers are like fast-food. They satisfy for the moment but eventually you develop more sophisticated tastes.

So, it's about time that someone created a personal computer that is so packed with features, it could be the last personal computer you'll ever buy. That someone is NEC, the third largest manufacturer of personal computers in the world. And the computer is the advanced technology APC IV.

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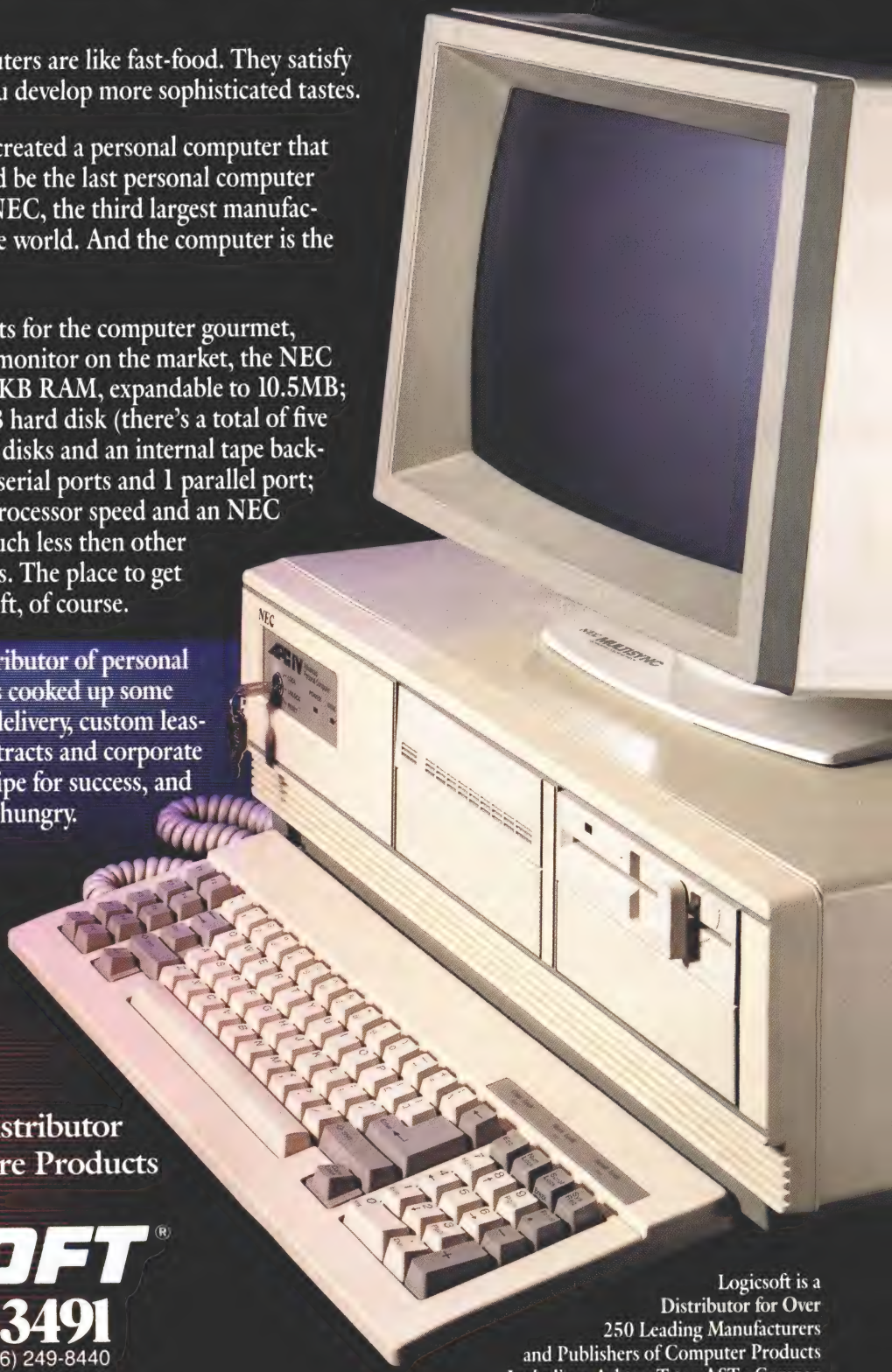

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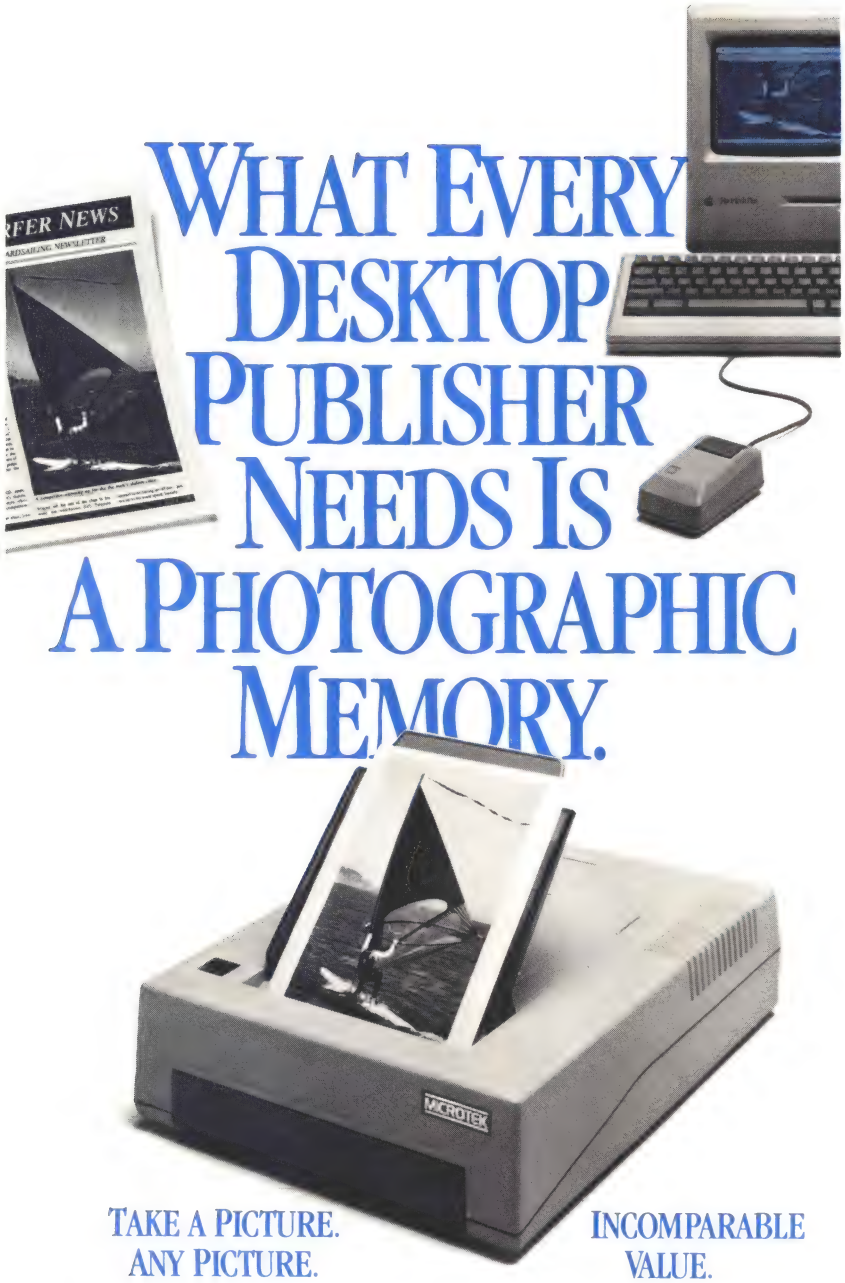

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Running *Logger* is like putting Big Brother to work for you. It's a memory-resident program that continuously monitors and records activities on your PC, then tells you how much time you spent playing games. *Logger* was born when the IRS was thinking of requiring detailed logs of computer use, and it found a home with accountants, lawyers, and engineers —even though the revenue officers later changed their minds. If you bill clients for computer use or need detailed records of your electronic activity, *Logger* is a must.

Like other memory-resident programs, *Logger* lurks just behind your workaday applications, waiting for something to stir it to life. In this case, that something is an event (or events) you specify in the program's Events Menu. If you set *Logger* on a hair trigger, it can keep tabs on everything.

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(continues)

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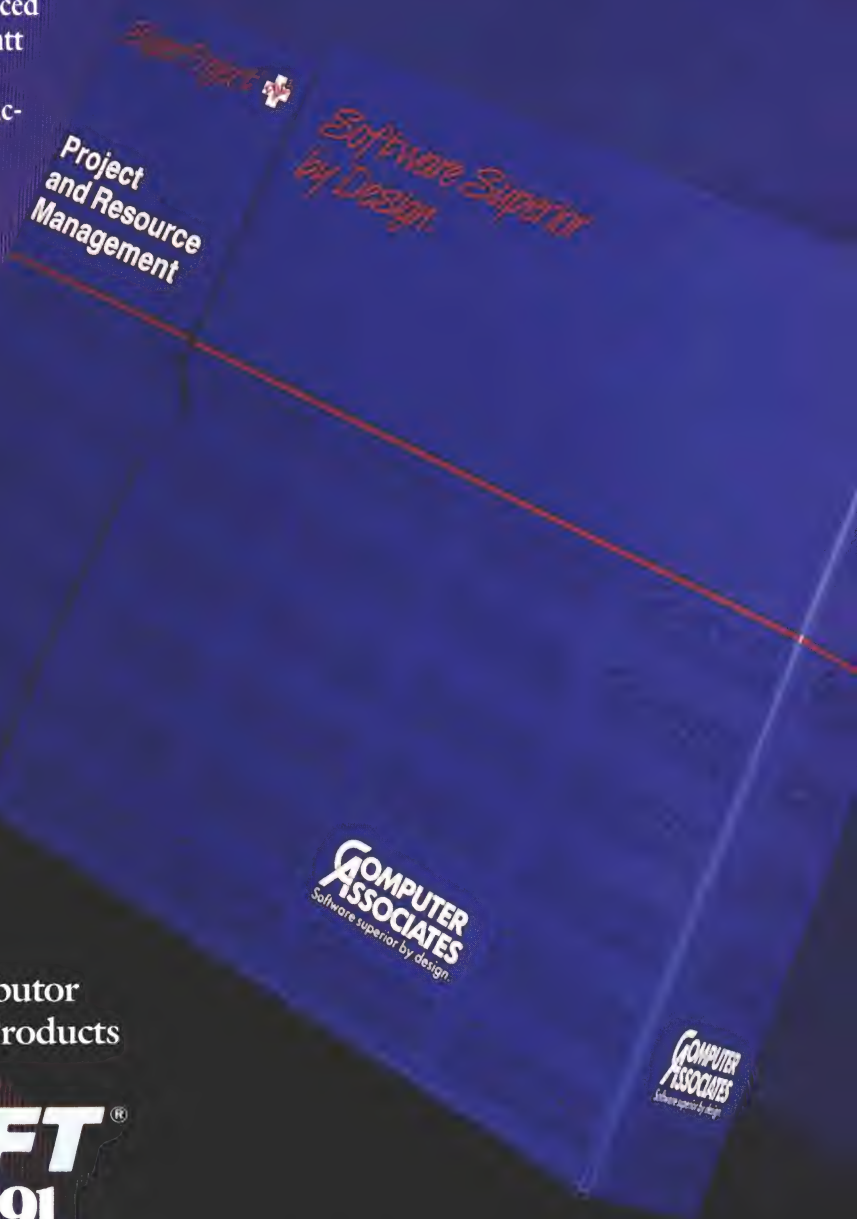

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```
End of report, press any key to continue . . .

Programs Used                Total Inuse Time
                                dd hh:mm
C:\LOTUS\123.EXE                00 01:20
C:\FAMILY\UTIL.EXE              00 00:11
C:\FAMILY\FR.EXE                00 05:58
C:\WP.EXE                       00 00:06
C:\WORDS.EXE                    00 00:05
C:\QED.EXE                      00 02:14
C:\PE.EXE                       00 03:00
C:\PARKER.EXE                   00 00:01
C:\DIRSORT.COM                  00 00:00
C:\COMMAND.COM                  00 00:01
C:\CHKDSK.COM                   00 00:01
C:\BR.COM                       00 00:02
C:\BASICA.COM                   00 00:01
C:\BASIC.COM                    00 00:04
C:\BAC.COM                      00 00:08
C:\ACC.EXE                      00 00:15

Note: Login times may be inaccurate if LOGOUT procedures are not followed
```

Screen 3: A program on your shoulder: Logger can record what you did and how long it took.

sort and tally the results. Reports may be routed to the screen, to a printer, or to ASCII or DIF files (see Screen 3).

For those who need to keep track of computer time by project or account number, a log-in/log-out feature tags and reports events under names supplied by the user. (Don't plan to use this feature as a security check for a PC with multiple users; it's easily defeated.)

Because *Logger* is not called into action with a hot-key combination, conflict with other memory-resident programs is reduced. It worked perfectly with *SideKick, Turbo Lightning, Reference Set, Webster's On-Line Thesaurus,* and other programs that live in my PC's memory.

Logger informed me that in a recent one-week period I'd spent a total of 13½ hours on the computer, including nearly 1½ hours with *1-2-3*, almost 6 hours running a genealogy program (FR.EXE), and a little more than 5 hours with two text-editing programs (QED.EXE and PE.EXE).

Although that doesn't add up to computer madness, it's enough to illustrate why running *Logger* on a hard disk is a good idea. Even though I was only recording program execution and termination, my LOG.LOG file grew to 41K in only a week. *—Donald B. Trivette*

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Copy protected

When you think of fine wine, does your mind's ear hear a little snap as the plastic cap twists off? Does the stuff under your chafing dish look good enough to drink? Ever pass the muscatel around a nice warm steam grate in midwinter?

Well, there's hope yet. When Anthony Dias Blue and the people at Paperback Software created a computerized expert wine adviser called *Wines on Disk*, they didn't have the Thunderbird crowd in mind. But they do help those who stride bravely up to a wine rack and promptly get lost in a sea of varietals.

For *Wines on Disk*, Blue personally selected nearly 600 American wines. And if you know wine, you know why Paperback Software selected *him*. Blue advises the cognoscenti (and would-be cognoscenti) on the *veritas* of vino for CBS radio and *Bon Appetit* magazine; he also publishes a wine

(continues)

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Circle 497 on reader service card

newsletter and is the author of *Anthony Dias Blue's Guide to American Wines.*

Wines on Disk can help you pick a bottle from a particular winery to put in your cellar, but most people will probably use it to figure out what to drink with dinner. To tell the program what's cooking, you choose from among 20 main dishes, ranging from roast beef, chicken, veal, fish, and game to liver, kidney, and sweetbreads. You can also factor in the sauce accompanying your repast.

After a bit of digital meditation, the program will recommend the type of wine to go with your entrée—red, white, sparkling, or rosé blanc de noir—by listing a number of familiar wines and mentioning how dry or sweet and light or heavy they are. Finally, the program asks how much you want to spend: Prices start at under $5 and ascend until you pop your cork. With the gustatory data in hand, this cybernetic sommelier rummages through its electronic cellar for several minutes and suggests from three to seven wines.

Wines on Disk would obviously be useful for special occasions, but how about everyday meals in a harried household? I decided to test it on an entrée I can't stomach without loads of catsup: meatloaf (which the program aptly categorizes under 'Other beef with tomato sauce').

After a time, I had the word from Mr. Blue: a 1984 Paulsen Vineyards red nonvarietal, which he describes as '100% Gamay Beaujolais. Dry. Light. 2 stars.

(continues)

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Fresh, fruity, smooth, very attractive. Easy to drink. One dollar per bottle goes to Farm-Aid. Probably priced at $5 or less.'

Wines on Disk works like a charm, and its copious suggestions and lucid menus make it easy to use. The program isn't particularly fast, and if you change parameters in midsearch, you can't go back and view earlier screens. A more serious drawback is the program's chateau chauvinism: It lists only American wines.

Still, as a brand-new computer wine expert, I'd give *Wines on Disk* four stars: fresh, peppy, smooth, lots of fun. Easy to run. Nice gift or leisure software. Available at $39.95 a disk. *–Leslie Lauderdale*

John Walkenbach is a freelance writer and consultant in Manhattan Beach, California. Donald B. Trivette is a freelance writer and consultant in Wrightsville Beach, North Carolina. Patrick Marshall edits the Commentary Page of the Oakland Tribune. *John McCormick is a freelance writer and consultant in Mahaffey, Pennsylvania. Leslie Lauderdale is the author of* Home Accountant Plus: A Guide for IBM PC Users *(Reston Publishing, Reston, Virginia, 1985) and a freelance writer specializing in instructional design.*

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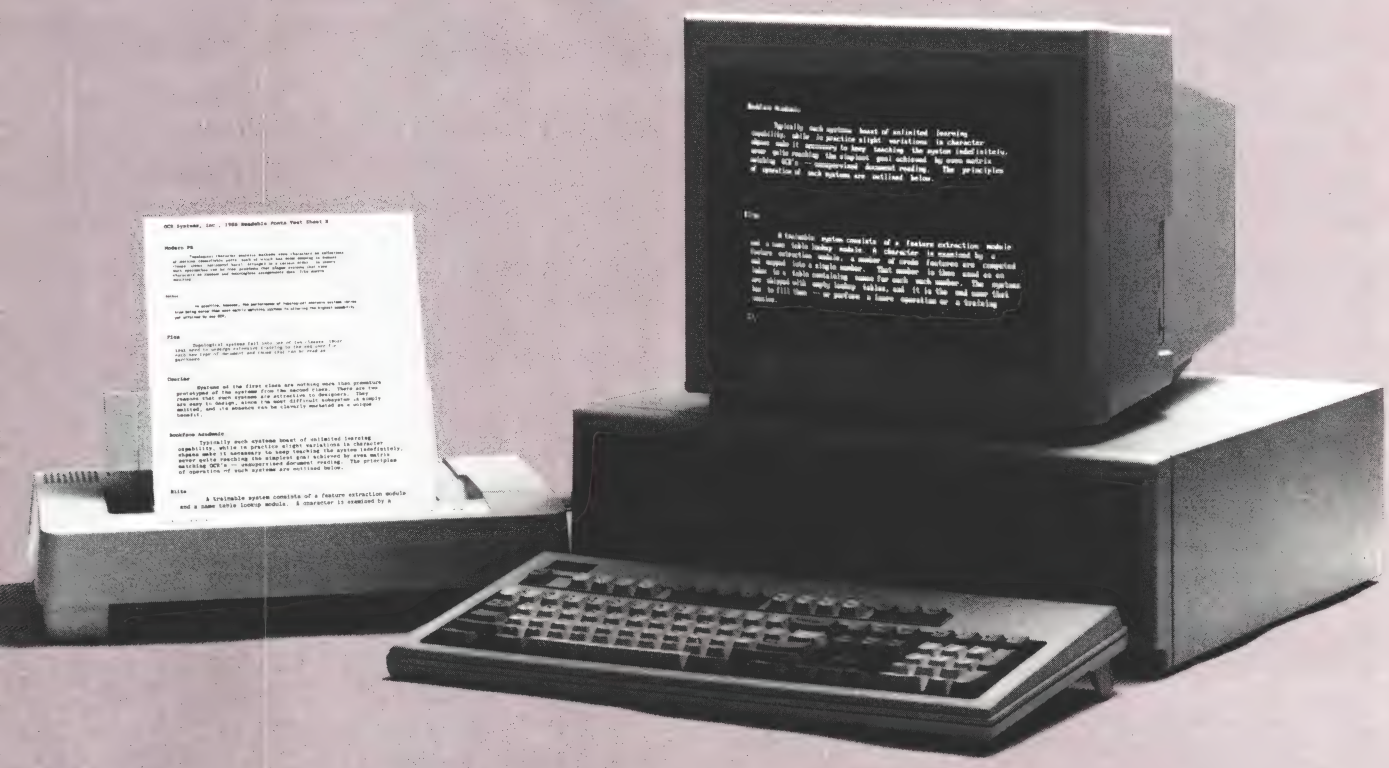
An "i" for an "i".



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From the Hardware Shelf

PC World offers first impressions of recent hardware releases

Will the XT 286 meet the same fate as the PCjr? Can the Z-181 corner the laptop market for Zenith? Is Sperry's Micro/IT small enough? And how can Kodak help you make clear projections with your PC?

Edited by Eric Knorr

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Given a free hand, the forces of marketing can foster some pretty strange products. Nowhere is this phenomenon more conspicuous than in IBM's hybrid of XT and AT technologies, the PC XT Model 286.

The XT 286 houses a 20MB hard disk in a traditional XT chassis, but that's where its resemblance to the XT ends. The computer is controlled by a no-wait-state 80286 CPU running at 6 MHz and comes with one serial and one parallel port, a clock/calendar, and 640K RAM (expandable to 12.6MB). The system includes an AT-style, half-height

(continues)

Mark Johann

Is it beast or fowl? IBM's XT 286 has the AT's 80286 CPU but the XT's smaller chassis. To further confuse matters, the three 16-bit slots are too short to fit standard AT boards.

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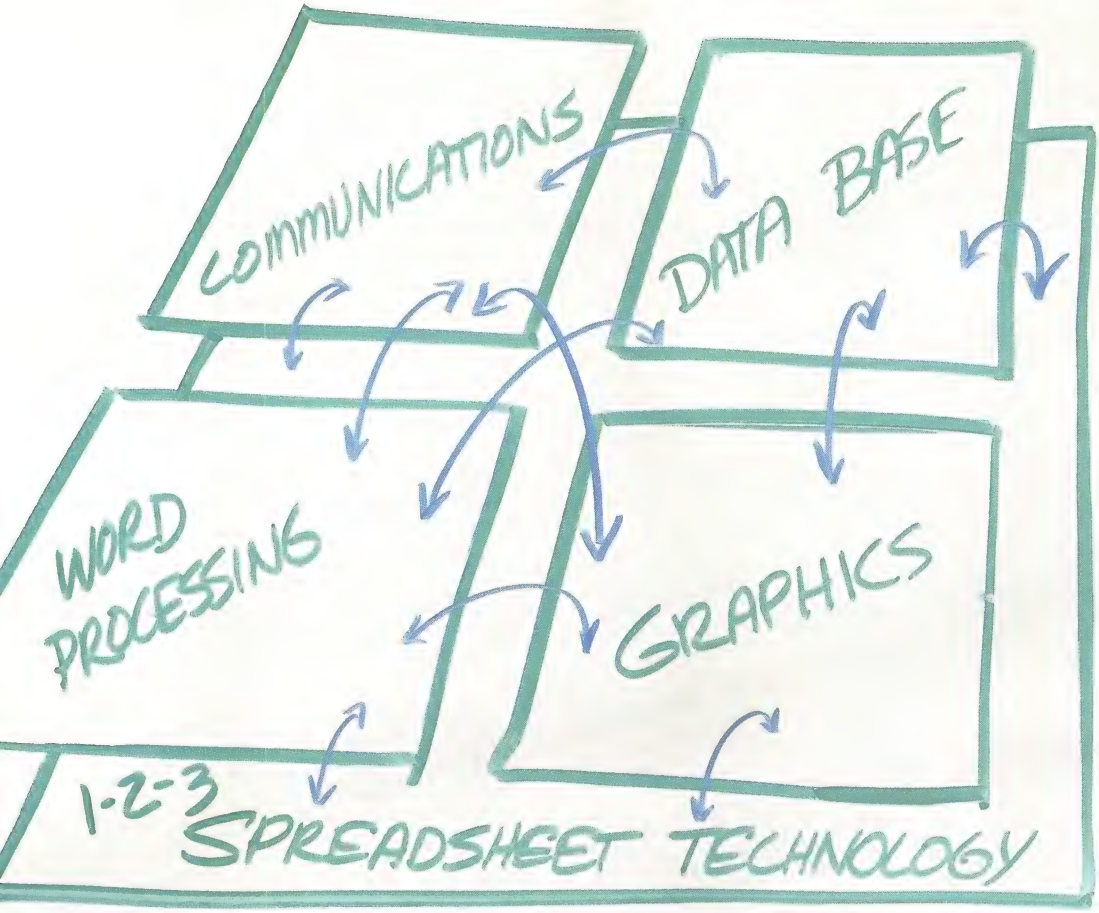
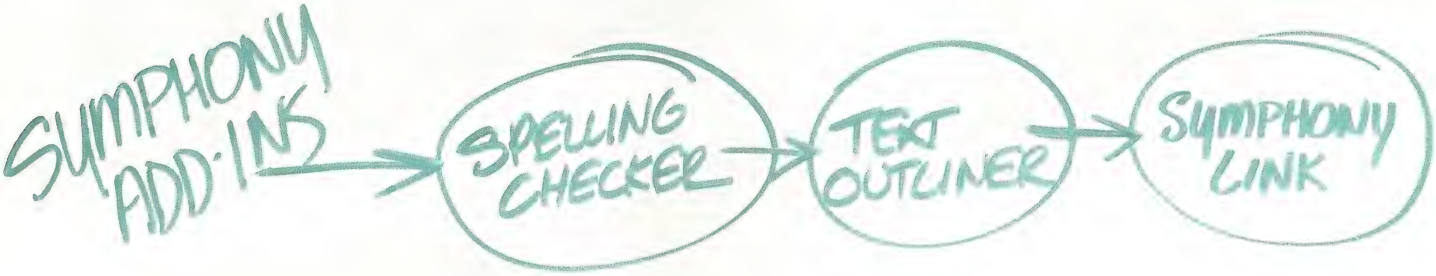




1.2MB floppy disk drive and an IBM Enhanced Personal Computer Keyboard. Five of the eight expansion slots have been upgraded to 16-bit status to accommodate AT expansion boards.

The XT 286 is clearly a niche product designed by marketing autocrats to exploit the broad pricing territory between the XT and the AT. IBM wanted to replace the original 6-MHz AT, which it discontinued the day the XT 286 was announced. (The old AT can still be purchased at the same price as the XT 286, but without a hard disk.) With the old AT out of the way, the $3995 XT 286 (6 MHz) sits comfortably between the $2895 XT (4.77 MHz) and the $5295 AT 339 (8 MHz).

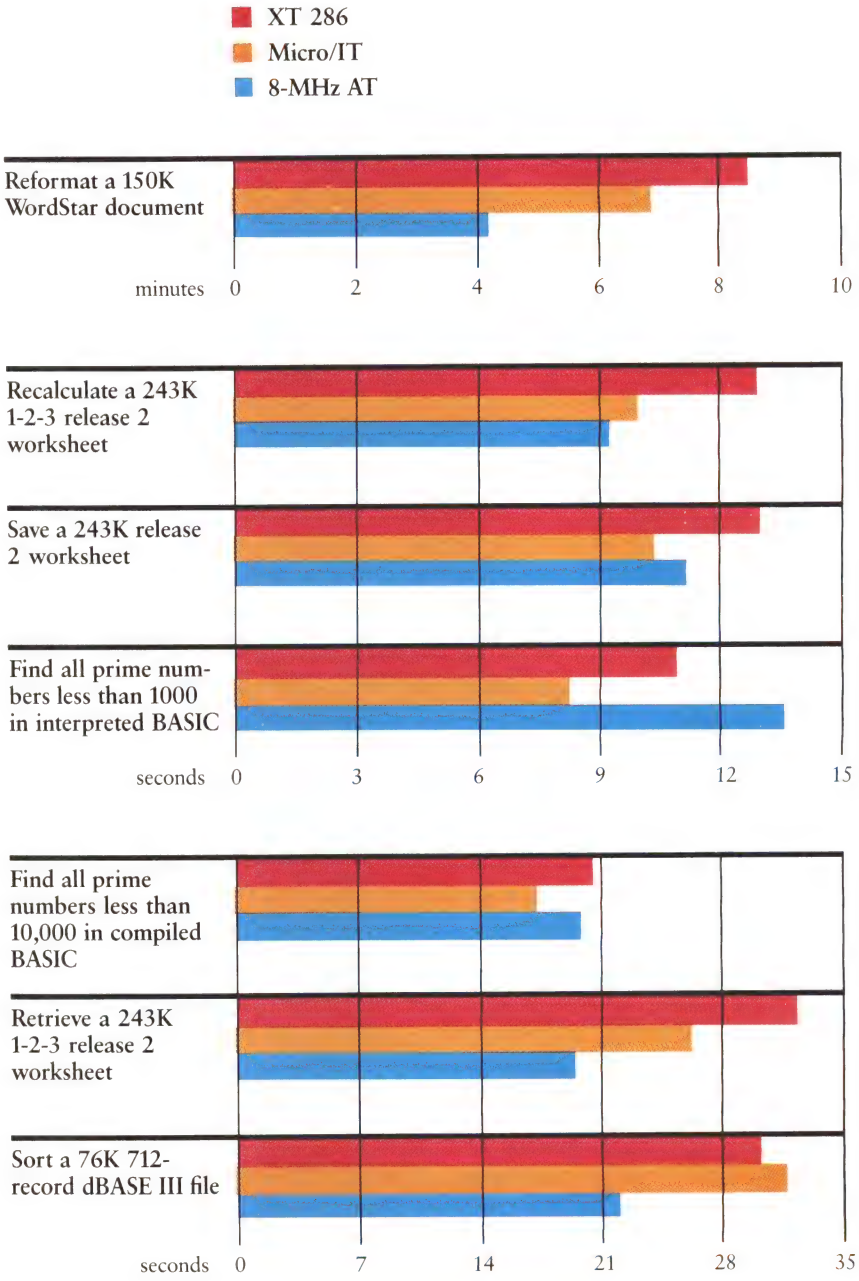
Supply and demand has also had an impact on the machine's design. Gearing up for the next generation of 80386 computers, IBM needed to dispose of its glut of 80286 chips. And despite Big Blue's price cuts in the XT line, the company still has a surplus of XT chassis and 20MB hard disks that it would like to unload.

IBM rates the XT 286 as 2.5 times faster than the XT. But because of the unit's no-wait-state memory, some operations are faster than with the old 6-MHz AT's one-wait-state design. In stark contrast, the XT 286's hard disk is more than twice as slow as the AT's: Access time is 85 milliseconds (ms), compared to the AT's 40 ms.

Furthermore, because of its 157-watt power supply (more powerful than the XT's, but weaker than the AT's), the XT 286 is incapable of controlling a hard disk larger than 20MB.

This hardware mix causes the XT 286's performance to fluctuate widely, depending on the application. Disk-intensive tasks such as data management will show only slight improvement over a standard XT, whereas some memory-based applications will approach the 8-MHz one-wait-state AT in performance. *PC World* benchmarks show the variations in speed (see Figure 1).

Figure 1: A couple of clones try to beat the AT.



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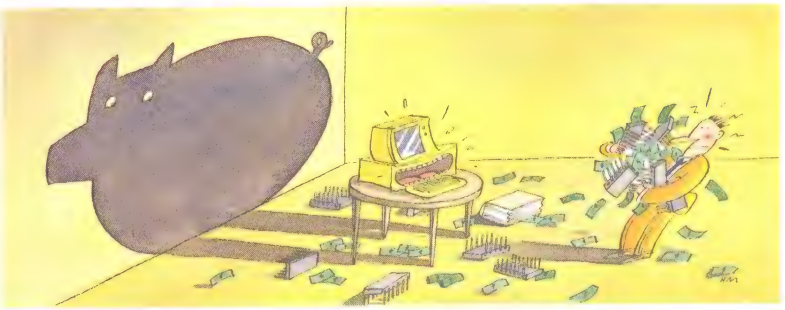

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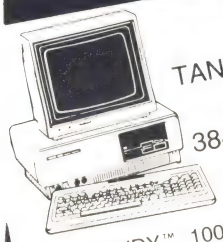

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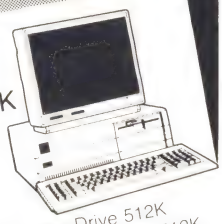

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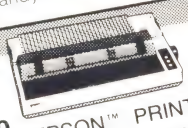

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Not surprisingly, the XT 286 is compatible with a wide range of software, successfully running every program we tested. As it stands, the machine is incompatible with the IBM Token-Ring PC adapter board; a software patch is available from IBM at no cost. The computer requires DOS 3.20 or Xenix 2.00, but DOS is not included. The only freebie that IBM includes is the Guide to Operations.

Hardware compatibility is another matter. The XT has five 16-bit and three 8-bit expansion slots, but unfortunately the chassis is too short for most AT-compatible boards. Unless the XT 286 is successful enough to inspire board manufacturers to produce specially designed 16-bit boards, the extra functionality of its AT-style slots will remain unexploited.

Two of the expansion slots are filled by the floppy/hard disk controller and a standard serial/parallel adapter. This improves upon the XT, which requires separate boards for controlling the floppy disk and the hard disk. Of the three 8-bit slots, two are referred to as half-size; as on the XT, however, the one next to the power supply is too short to house most half-size boards. The only full-length 8-bit slot is essential for such old-fashioned wonders as the original Hercules Graphics Card.

Besides the half-height 1.2MB 5¼-inch disk drive that comes with the XT 286, you can choose from any of three half-height floppy disk drives to fill up the drive slot below it: a second 1.2MB drive, a 360K 5¼-inch drive, or a 720K 3½-inch drive. The computer can also control the external 3½-inch drive sold as an option with the PC Convertible.

Reviewing the XT 286 gave me my first extended trial with the new IBM Enhanced Personal Computer Keyboard, which comes with the XT 286 and with all new PC, XT, and AT models. Some of its enhancements are welcome; others are not. The <Esc> key now sits prominently in the upper-left corner, and the addition of the <F11> and <F12> function keys, as well as the <NumLock>, <CapsLock>, and <ScrollLock> LED indicators, is commendable. The new bank of cursor control keys separate from the numeric keypad, however, forces the function keys into a row along the top of the keyboard. If you use a program like *WordPerfect,* which relies heavily on the function keys in combination with <Ctrl>, <Alt>, and <Shift>, the new arrangement will present a serious obstacle.

Another unwelcome enhancement is the repositioning of the <Ctrl> key to below the left <Shift> key. This arrangement requires the use of both hands to execute <Ctrl>-*key* sequences and severely inhibits programs that depend heavily on such combinations. Finally, just when the AT's L-shaped <Enter> key had set a new standard, IBM inexplicably shrank the key to a horizontal bar. Yet the keyboard, with its crisp action, remains the best in the business. The clickety-clack has been muffled, but the feel is as sure as ever.

(continues)

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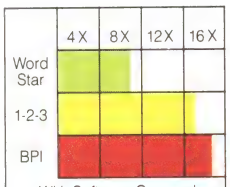

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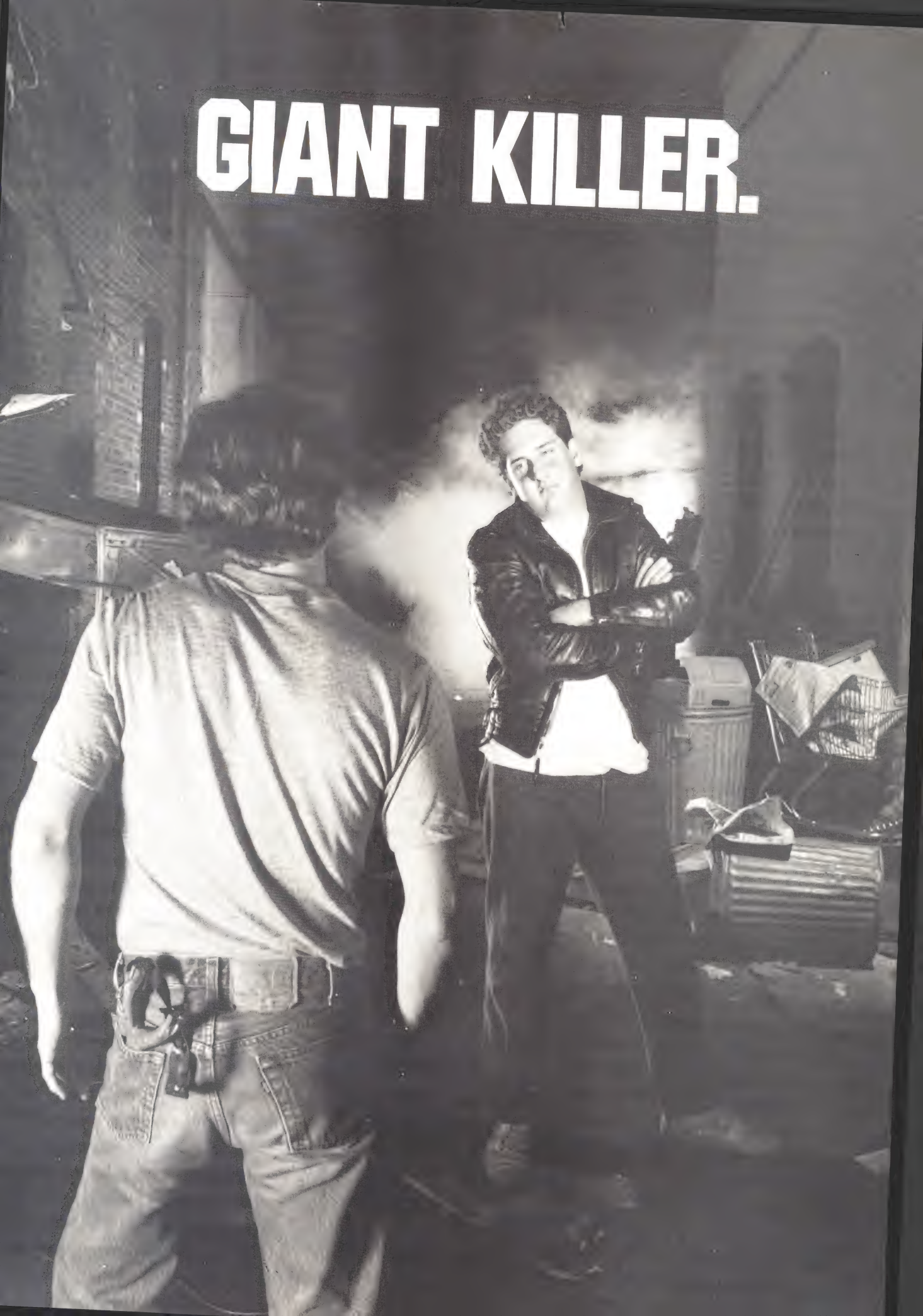
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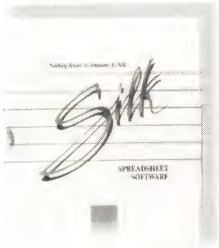

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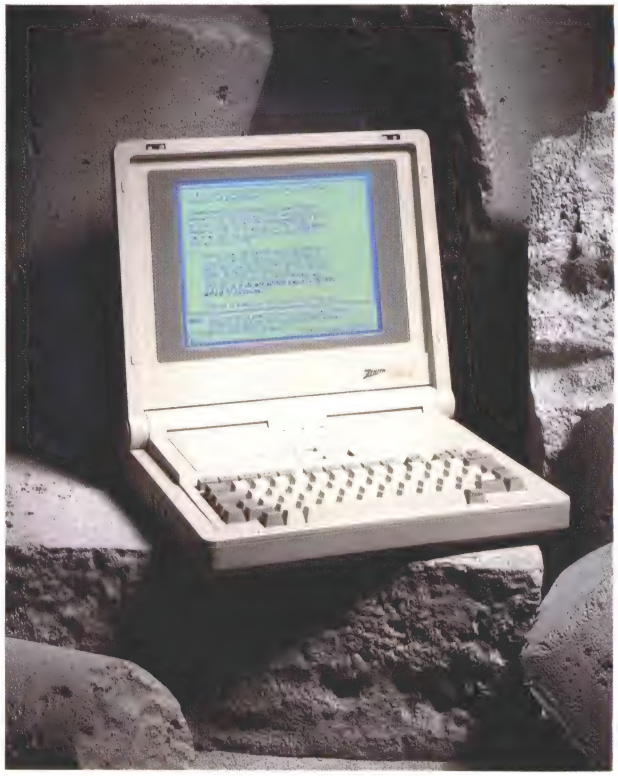

Mark Johann

Combining supertwist technology and electroluminescent backlighting, the Zenith Z-181 offers one of the most readable LCD displays on the market.

While the XT 286 can boast the dependable performance and rugged construction of most IBM machines, it appears to be a compromise computer in search of an identity. With 16-MHz 80386 entrants already among us, is such a niche machine necessary? Cost and speed are normally a PC's two biggest selling points, but the XT 286 is too expensive for buyers in search of a dependable introductory unit and too slow for power users. Although IBM may intend the XT 286 to assume the low-end, journeyman role of its 8088-based computers, the machine would need a substantially lower price to match the competition. A more likely scenario is that, within a year, the PC AT will be IBM's midlevel PC, and the XT 286 will be only a fading memory. *–Eric Brown*

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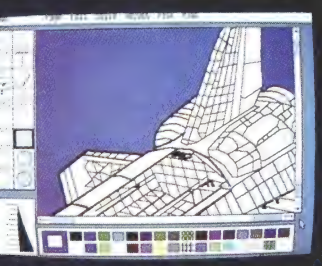
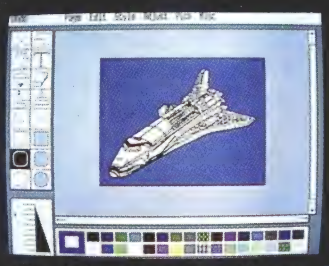
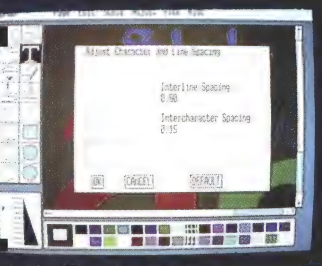

One screen of a 64-screen image.

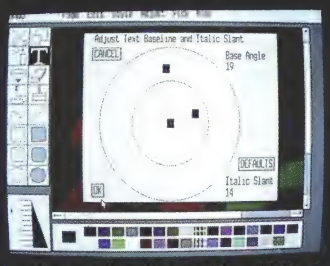

Shrink down to a manageable size.

Next, cut-and-paste . . .

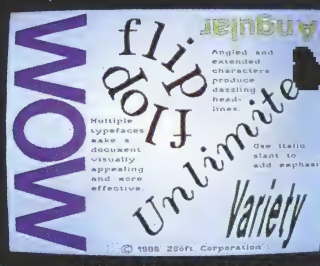
A few edits later . . . VOILA!

New typography frontiers: continuously adjustable point sizes, text slope, line and character spacing, extended and condensed type, and letter slant.


Easy-to-use menus.


Slant and angle text 1° – 359°.

4- to 250-point type.



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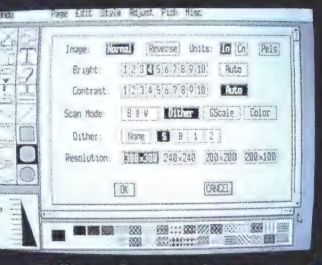
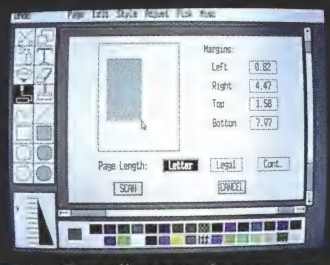

Full use of scanner features.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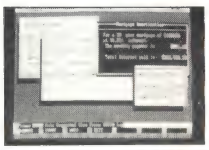

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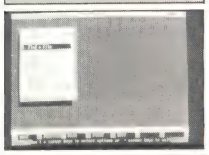

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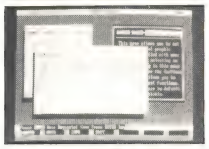

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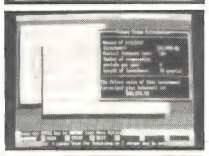

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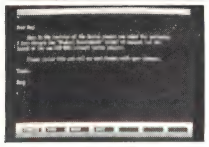

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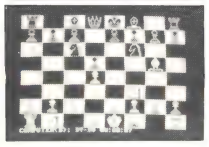

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PCW3

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disk drives and mediocre LCDs. If the IRS had waited a few months, it could have had a machine not only with the same $2399 price but also with arguably the best LCD on the market—the Zenith Z-181.

The Z-181's backlit screen makes the IBM Convertible's display look like a pale ghost. In fact, the Z-181's blue-on-white screen is noticeably more readable than that of the Data General/One Model 2 LCD, and with a contrast ratio of 12 to 1, it's a bit more readable than the display offered by the Datavue 25. The Z-181's supertwist LCD layer, manufactured by Sanyo, is legible even from an oblique viewing angle, and the electroluminescent backlighting panel underneath makes computing in the dark a distinct possibility. To make matters even better, the Z-181—like the Data General/One Model 2 LCD—preserves the standard PC monitor's aspect ratio with an 8⅜-inch-by-6⅜-inch screen. In other words, you won't get egg charts when you order pie charts.

At about 12½ pounds, the Z-181 is over 15 percent lighter than the Z-171. The plastic clamshell chassis measures a little more than 1 foot square by a slim 3 inches high—far more stylish than its clunky predecessor. Flipping up the screen reveals a compact keyboard and a pair of pop-up 3½-inch disk drives. Two lights indicate which drives are active, and a third light signals when power is running low. Beneath the blinkers are a speaker baffle and contrast and brightness controls.

The Z-181's brain is an 80C88 microprocessor running at 4.77 MHz. The machine comes with 640K, 512K of which is held in a plug-in module stowed next to the internal battery pack. Zenith states that a fully charged battery lasts four hours; this proved a reasonable estimate when the disk drives were used sparingly. The external battery charger takes about 8 hours to energize the battery pack.

A little rubber plug on the bottom of the machine covers a recess containing a DIP switch block with which you can specify the type and column width of the display and the number of disk drives. Three of the four ports tucked behind a plastic door on the rear of the machine enable you to hook the Z-181 to a parallel printer, an external 5¼-inch floppy disk drive, and an RGB monitor. The fourth port, a serial connector, lets you establish a link to another PC; Zenith provides both the null modem cable and the software for that purpose. This arrangement is a necessity because the Z-181's external disk drive is not yet available, leaving the machine's optional 1200/300-bps modem as the only other vehicle for bridging the gap between 5¼-inch and 3½-inch formats.

However you transfer software to your computer, the Z-181 should have no trouble running it. A variety of PC programs tootled along without any snafus, including *1-2-3, dBASE III, SideKick, SuperKey, WordStar, Jet, PC Paint,* and *Flight Simulator.* From my experience, this laptop is more PC compatible than the IBM Convertible.

The keyboard is a perfect complement to the machine's outstanding screen. Unlike most laptop keyboards, which are undersized and mushy, the Z-181's is full-size and responsive. As usual, the function keys are arrayed horizontally along the top next to an inverted-T cursor pad, and a cluster of letter keys make up the numeric keypad, which is activated by the <NumLock> key. Unfortunately, some odd key placements mar an otherwise sensible design: <CapsLock> wedges its way in between the A key and <Ctrl>, and <NumLock> shows up uninvited where the <CapsLock> key normally appears.

The carrying case ($89 extra) is made by American Tourister and resembles a soft briefcase. There's room enough for the recharger, and the case has special pockets for disks and for the manual, as well as a large pouch for printouts. The case is indispensable for travel, as the Z-181 itself has no handle.

Zenith's competitors will inevitably pick up on the company's stunning combination of supertwist and backlighting. By then, Zenith itself may have solved the Z-181's performance problems. In the meantime, thousands of auditors are squinting at Z-171 displays, wishing the IRS had waited a little longer. —*Wayne Rash*

(continues)

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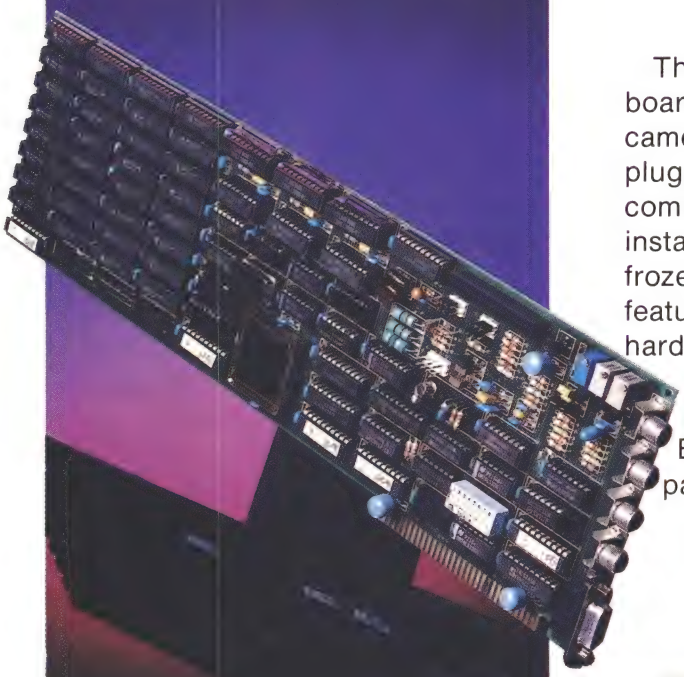

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The new Professional Image Board is a PC board which allows an ordinary home video camera (color or black-and-white) to be plugged into an IBM personal computer or IBM compatible. Now, live, fast action scenes can be instantly captured in full color and frozen. The frozen pictures can be computer enhanced feature by feature and stored on a floppy or hard disk. The frozen pictures can also be transmitted to any remote computer in the world via modem. The Professional Image Board also allows you to perform cut and paste operations with most popular software.

Unretouched frozen video image in full color. Captured with ATronics' Professional Image Board.

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Mark Johann

The cute box with the colossal price: The Sperry Micro/IT's chassis is smaller than its monitor, but the model shown here will set you back a monstrous $5675.

Sperry Micro/IT

AT compatible

Pros: *Small footprint, switchable clock, built-in parallel and serial ports, externally accessible DIP switches*

Cons: *Slow hard disk, high price, limited expandability*

Sperry Corp.
P.O. Box 500
Blue Bell, PA 19424
215/542-4213

List price: basic model with 512K RAM $2345, enhanced model with 20MB hard disk $3540; 1.2MB floppy drive $275, 360K floppy drive $225; PC-compatible keyboard $155, AT-compatible keyboard $190, enhanced keyboard $250; monochrome monitor $275, color monitor $680, enhanced color monitor $849; monochrome display adapter $225, color graphics adapter $244, enhanced color graphics adapter $524; 1MB memory daughterboard $295, 2MB memory expansion board $995

Now that IBM's AT has been cloned ad infinitum, new 80286 machines need a distinct identity to capture buyers' imagination. Think speed, and a PC's Limited machine will come to mind; think low price, and you'll probably envision a Leading Edge clone; think small, and Sperry would like you to consider the Micro/IT.

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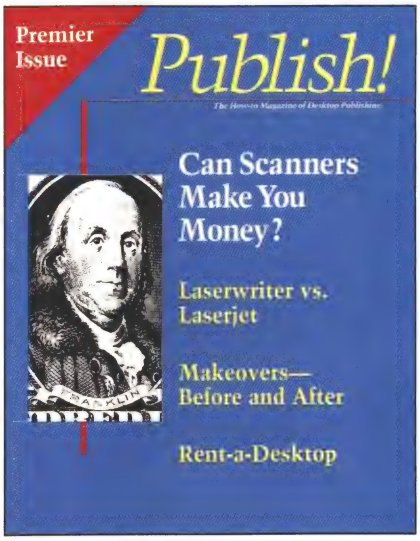

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It's not often you run across an AT-compatible chassis that occupies less space than its monitor. Sperry accomplishes this feat in part by mounting the Micro/IT's five expansion slots horizontally, resulting in a footprint that's a mere 15 inches square—the same width and depth as AT&T's 6300 Plus. Unlike the Plus's three 16-bit slots, however, the Micro/IT's three 16-bit slots are AT compatible, and the machine's height is about an inch under that of its AT&T counterpart.

Perhaps the Micro/IT represents a diminutive engineer's reaction to Sperry's PC/IT, whose elephantine footprint eclipses even that of IBM's AT (see "From the Hardware Shelf," *PCW*, September 1986). Of course, condensing a box involves trade-offs; with five slots, the Micro/IT has half the expandability of its big brother. Nonetheless, the Micro/IT has a slot-saving trick or two up its sleeve, including one parallel port and one serial port built in, plus a floppy disk controller that's part of the floppy drive itself.

One obvious similarity with the PC/IT is the Micro/IT's big ticket, although Sperry does its best to hide this excess with a bizarre pricing scheme. At $2345, the Micro/IT's basic model is about as stripped down as you can get: The little box has 512K of motherboard RAM but no disk drive, keyboard, monitor, or display board. The $3540 "enhanced" model adds a MiniScribe half-height 20MB hard disk (with controller), but keyboard, display, and floppy drives are still lacking. The Micro/IT can accommodate two externally accessible half-height devices; for the second bay, Sperry sells a $275 1.2MB and a $225 360K floppy drive.

For those who might want to key in data now and again, Sperry offers three keyboards: a $155 PC

(continues)

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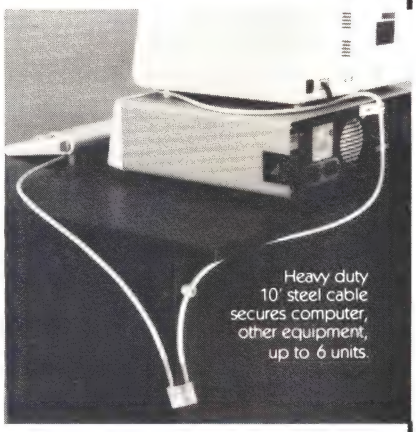

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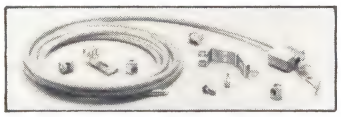

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model; a $190 version of the original AT layout; and a $250 copy of the new enhanced keyboard, complete with top-mounted function keys and separate numeric and cursor-control keypads. The keyboard that came with the machine under review had the old AT's layout but not quite the same snappy feel, and one or two keys would stick on occasion.

The range of display options includes a $275 green monochrome, a $680 color, or a $849 enhanced color monitor. The boards for these monitors are priced at $225, $244, and $524, respectively. The review machine sported the enhanced display, an attractively designed unit that may be a bit brighter and sharper than its IBM predecessor.

The memory and mass storage of the Micro/IT are similar to those of IBM's XT 286. Both machines feature fast, no-wait-state RAM and relatively slow hard disks (85-ms average access time). The Micro/IT's 8-MHz clock rate is 2 MHz faster than the XT 286's, but like IBM's entry, it drags during a disk-intensive *dBASE* sort (see Table 1).

As with Epson's Equity series and a number of other thoughtfully designed machines, the Micro/IT locates its DIP switches behind a little front door. All three CPU clock speeds—6 MHz, 7.16 MHz, and 8 MHz—can be selected with these switches, and you can opt for the desired video mode, keyboard type, and parallel or serial port configuration without opening the machine. The standard AT-like keylock, power light, and hard disk access light also occupy the front panel; you need a sharp object to actuate the carefully recessed reset button.

When you open up the Micro/IT, a safety switch automatically turns off the machine's power. This may frustrate some tinkerers initially, but a piece of tape can easily defeat the switch. Repair people trying to access key areas of the machine could experience far greater frustration. For example, the power supply overhangs

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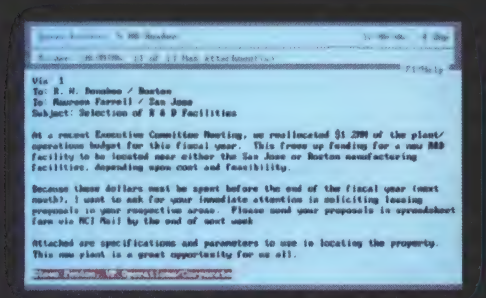

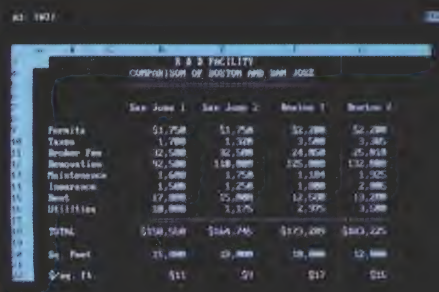

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the motherboard and must be removed to reach the CPU. Moreover, the CPU is surface mounted instead of socketed, ruling out installation of most 80386 turbo boards.

By and large, the Micro/IT is a tight piece of engineering. The 1MB daughterboard (sold as an option for $295) jacks up the machine's RAM to 1.5MB without taking up an expansion slot. An especially cute touch is the CMOS clock/calendar battery, mounted with a velcro strip. Most significant, however, is the fact that the serial port can be set for synchronous communications, enabling software-based communication with mainframes without the addition of a terminal emulation board.

When it comes to software compatibility, the Micro/IT shows its colors by running *WordPerfect, SideKick, Jet, SuperKey, Framework II, WordStar, dBASE III,* and *1-2-3* releases 1A and 2. The machine also held up under IBM's VDISK, PC-DOS 3.10 and 3.20, and even AT Diagnostics.

As Sperry continues its marketing push toward Fortune 500 companies, the Micro/IT should attract attention. The wide range of options makes it suitable for a variety of environments, and the small footprint is ideal for limited office space. But snazzy engineering aside, the Micro/IT suffers from the same drawback as its PC/IT sibling: high price. A fully configured Micro/IT with a 20MB hard drive, a 1.2MB floppy drive, 1.5MB of RAM, an enhanced color monitor and display adapter, and an AT keyboard comes to $5673—an indication that Sperry may have bought the myth that corporate buyers aren't price-sensitive. If you're enamored of the Micro/IT's design, you'd do well to buy the basic machine and load it with third-party peripherals (such as a faster hard disk) that boast prices as low as the box is small. —*Paul Meyers*

(continues)

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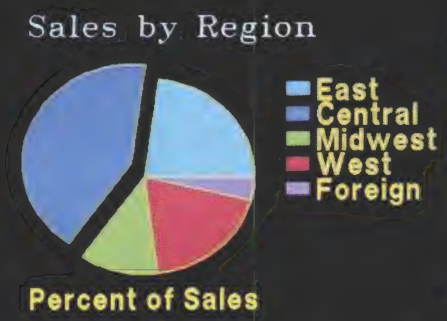

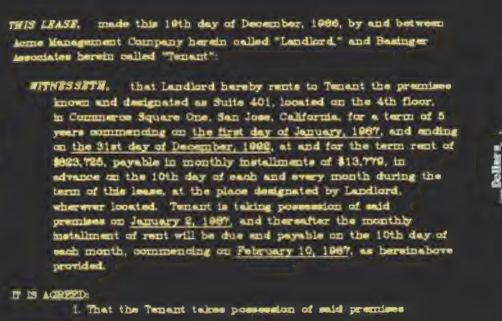
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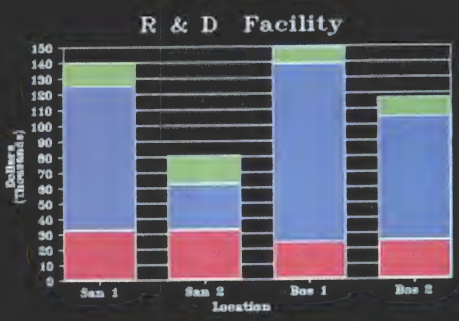

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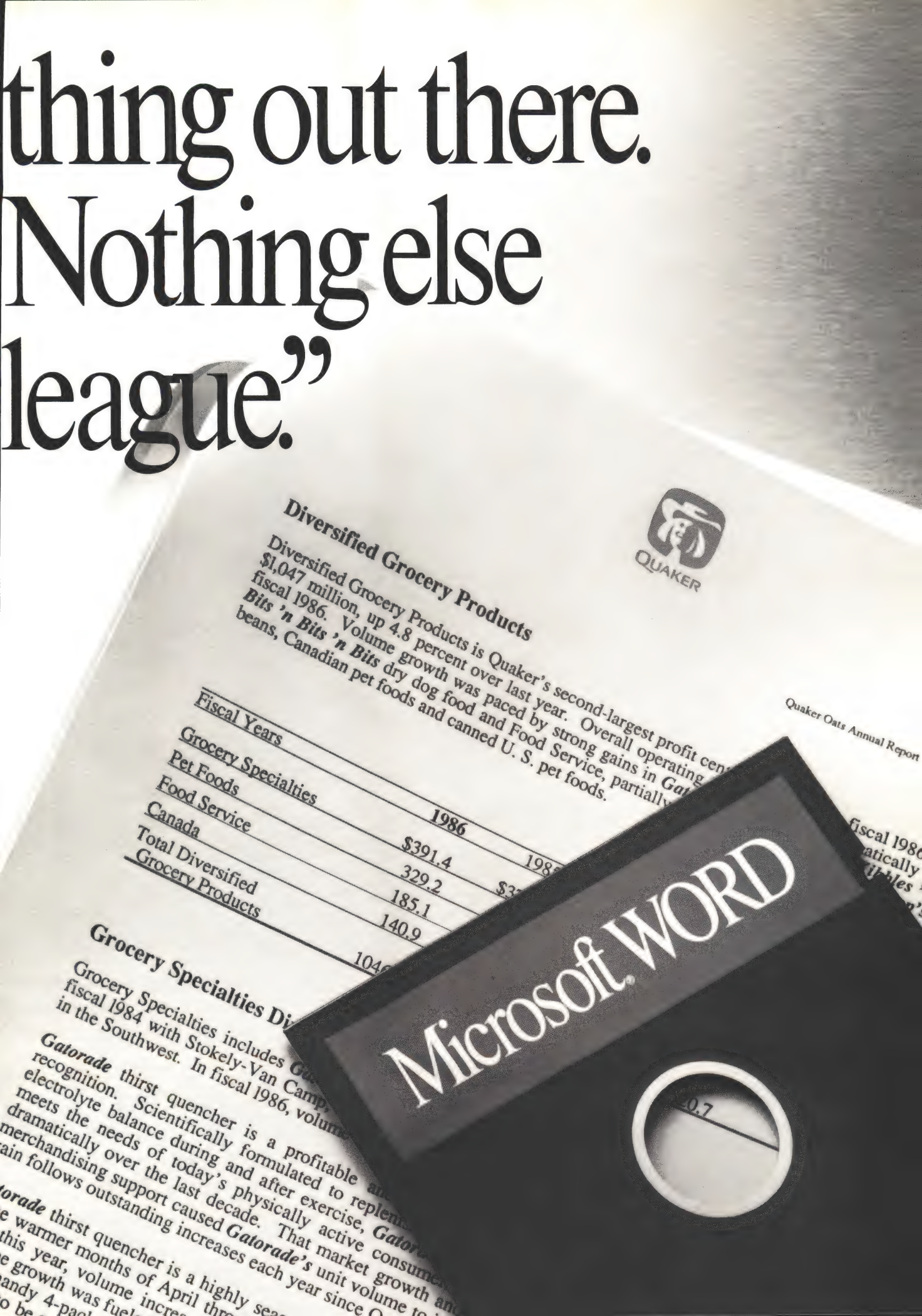

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Mark Johann

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Requirements: IBM Color/Graphics Adapter or compatible, 256K, serial port for remote operation

PC displays aren't crowd pleasers. Beyond gathering the staff around the enhanced color display, about the only PC-based techniques you can use to reach a roomful of people are video projectors ten times the price of a PC or murky, low-cost projection systems such as Limelight (see "From the Hardware Shelf," *PCW*, February 1986). For most people, traditional slides or transparencies are the only workable options.

A quirky, ingenious alternative, Eastman Kodak's DataShow Projection Pad System is a felicitous combination of convention and high technology. DataShow is a framed liquid crystal display, about the size and weight of a three-ring binder, that fits on top of the lecturer's favorite helpmate,

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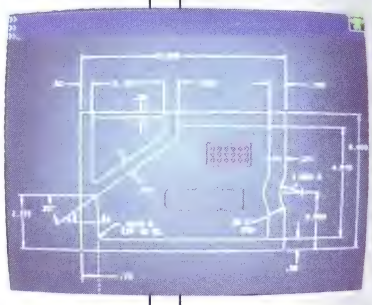

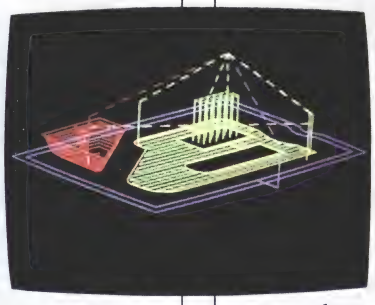

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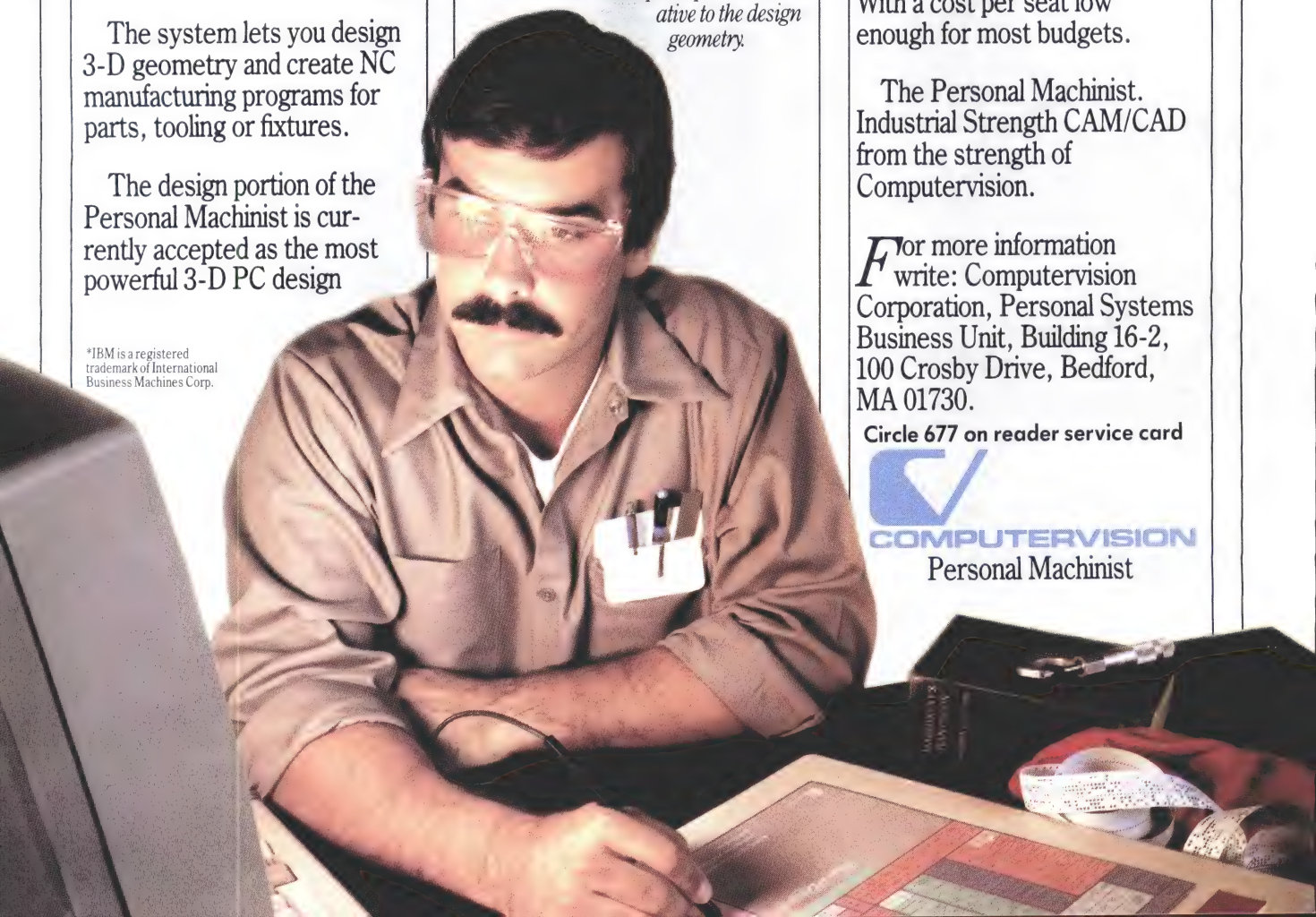

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If you haven't guessed it already, DataShow plugs directly into the RGB output of a CGA and is only compatible with that board. Thoughtfully, Kodak has built an RGB port into DataShow's chassis, so you can watch the presentation and the rapt faces of your audience simultaneously. DataShow has its own power supply, which plugs directly into a wall socket.

The DataShow system includes a software package entitled ShowMaker, which is designed for creating a series of pseudotransparencies. This easy-to-use, page-by-page display program includes a screen-capture facility for filching pictures from your favorite spreadsheets, graphics packages, or pinball games. Of course, you can use DataShow with any graphics software that supports the CGA.

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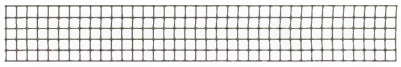


Show. This little box lets you control screen position, contrast, focus, and inverse video—and of course, page forward or backward through screens. Kodak avers that it's developing a program that assigns buttons on the remote control to keyboard characters, enabling you to steer presentations remotely using popular software packages.

One final caveat for presentations. To get a bright image, you'll need a quality overhead projector with a high-wattage bulb. Be sure to use the transmissive style; Kodak does not recommend opaque (also called reflective) projectors for use with DataShow.

Regardless of what projector you choose, you'll be able to use DataShow for a long time; Kodak projects the life of the LCD crystals to be between 5000 and 10,000 hours. So get your audience comfortable and tell them to enjoy the show: They'll find it far more captivating on the big screen. *—Jay Alperson*

Eric Brown is a Contributing Editor for PC World. *Wayne Rash is a freelance writer, a senior analyst with American Management Systems of Arlington, Virginia, and an office-automation and microcomputer consultant to the federal goverment. Paul Meyers is an independent San Francisco video producer and a freelance writer. Jay Alperson is a freelance writer and the developer of Instruct, an authoring language for teachers.*

New Version 3.0 with
- New Network Commands
- NETBIOS Support

EasyLAN—Networking With Netbios Support. And it's Only $99.95 Per PC.

If you own two or more PCs then you need *EasyLAN*™ version 3.0.

THE *EasyLAN* OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. *EasyLAN* can save you $1,000 or more per PC by eliminating duplicate equipment purchases.

And now, you can run NETBIOS supported applications. Or you can write your own network applications for *EasyLAN* and other NETBIOS compatible networks.

EasyLAN VERSION 3.0 HIGHLIGHTS

- ***EasyLAN* shares printers, plotters, data, and disk storage**
- **Supports up to 18 PCs or compatibles**
- **New Network Commands**
- **New NETBIOS**
- **PC to PC file transfer**
- **Print spooling**
- **PBX support**
- **Easy to install**
- **Easy to operate**
- **Modem support**
- **Performs in the background**

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than $100 per PC.

EasyLAN performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ Wordstar,™ and dBASE.™

NEW NETBIOS SUPPORT—WRITE YOUR OWN COMMUNICATIONS PROGRAMS.

Programmers may use *EasyLAN* to develop network applications using NETBIOS (interrupt 5c). These applications can now be operated across the low-cost RS-232 communications links used by *EasyLAN*. Our new *EasyCALENDAR* program is an example of a network application that uses NETBIOS for program-to-program communications.

Multi-user data-base management applications that require a high-overhead network operating system will perform faster on high-cost networks operating at megabit speeds.

NEW VERSION 3.0 COMMANDS EXPAND NETWORK FLEXIBILITY

EZCLOCK lets PC's attached to the network read the time and date from a single master clock on the central PC, eliminating the need to install individual clock boards in each PC and insuring that all file entries and updates made across the network are dated.

The EZ Make Directory and EZ Remove Directory commands function identically to the DOS MKDIR and RMDIR commands, and give remote users increased flexibility when it comes to managing subdirectories on the central PC.

EZBEEP lets you send an audible signal across the network, alerting a PC user that a file or message is being sent.

***EasyLAN* PBX SUPPORT BRINGS NEW FLEXIBILITY TO PC CONNECTIVITY**

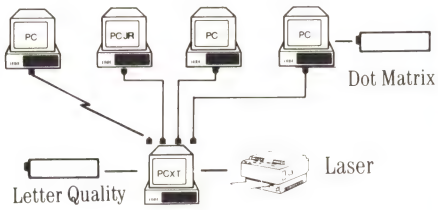
With *EasyLAN's* PBX support, users can share peripherals and transfer files using PBX switched-circuit connections and existing twisted-pair wiring. *EasyLAN* has already been installed on a number of different PBX's, and recently was certified by Northern Telecom for use on its Meridian SL-1.

"The value is high ☕☕☕☕*"*

—InfoWorld Report Card

Disk sharing uses *EasyLAN's* EZCOPY command to move files to and from PC's. ASCII or binary files can be transferred in the foreground, or in the background while other DOS programs run.

Printer sharing operates transparently with existing programs. Print files are automatically spooled to disk and scheduled for printing. Multiple printers on the central PC may be designated for individual printing tasks.



***EasyLAN* Office Network**

EasyLAN SPECIFICATIONS

Each PC in the network requires an individual licensed copy of the *EasyLAN* program and takes 20k of memory on each satellite PC, a serial port, and DOS 2.0 or above. *EasyLAN* runs on all IBM PC models and compatibles. The central PC requires a serial port for each satellite PC. The COM2 and COM6 boards are serial port expansion boards which permit you to add serial ports to the central PC.

EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. The *EasyLAN* Network Configuration Program provides menu driven installation program that will guide you step-by-step through the software installation process.

***EasyCALENDAR*—USE YOUR NETWORK TO SCHEDULE MEETINGS.**

The first of a new series of *Easy* network application products using NETBIOS is now available. *EasyCALENDAR* handles time management applications for individuals or a department and can be run on personal computers attached to any NETBIOS-compatible network.

Highlights:

CALENDAR MANAGEMENT for individuals and the work group.

TASK MANAGEMENT to create, maintain and review to-do lists.

TODAY'S NEWS for broadcasting messages, notices or announcements across the network.

MENU INTERFACE for easy set-up and use.

EasyCALENDAR's Data base for appointments, to-do lists and news resides on the central PC. Satellite PCs attached through *EasyLAN* version 3.0 send network transactions to the central data base to invoke *EasyCALENDAR* functions.

The *EasyCALENDAR* calendaring program requires *EasyLAN* version 3.0 and is priced separately.

EasyCALENDAR will be available March 1987. Advance orders are being accepted now.

"I bought access to a laser jet printer for less than $100."

—CONOCO Oil User

EasyLAN

ORDER TODAY 1-800/835-1515 in CA **408/738-8377**

EasyLAN Order Form

To Order by Phone—Call **800/835-1515**
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Server Technology, Inc., 1095 East Duane Ave. #103
Sunnyvale, CA 94086 Telex 5106003481

Item	Description	Price	Qty	Amount
EL 02	*EasyLAN* Kit—for 2 PCs 30′ cable, two disks & manuals	$219.95	___	$ ___
EL 03	*EasyLAN* Expansion Kit—for 1-PC 30′ cable, one disk & manual	$119.95	___	$ ___
EL 10	*EasyLAN* disk & manual (3½″ disk $89.95)	$ 99.95	___	$ ___
EL 12	*EasyLAN* 30′ cable	$ 49.95	___	$ ___
EL 13	COM2-serial port expansion board, two ports	$219.95	___	$ ___
EL 14	COM6-serial port expansion board, six ports	$489.95	___	$ ___
EC 01	Easy CALENDAR Kit Supports 6-PC's and 10 people	$199.95	___	$ ___
EL 15	Custom length cables, call for quote			
	CA res. add applicable sales tax			$ ___
	Shipping charge USA $10.00, other $20.00			$ ___
			TOTAL ORDER	$ ___

Circle 457 on reader service card

9:02: *"A database manager? How many months will this take?"*

12:04: *"Wow, my first report. And there's still time for lunch."*

2:19: *"From now on I'm taking the easy way out."*

What it does is hard. How it does it is easy.

The reason most people use a database manager is to make work easier. But most database managers are so difficult to use they end up making work harder.

That's why many companies that had already standardized on complex systems like dBASE® are re-standardizing on DataEase.™

DataEase. No database manager that does as much is easier.

DataEase is easy because you don't have to program. Menus with easy to understand commands like "cut" and "paste" lead you through the process of setting up forms, files and reports.

And DataEase is just as powerful as much more complex systems. But the power of DataEase becomes available as you need it. So the transition from building simple applications to building complex ones is smooth. And easy.

DataEase also makes it easy to use information stored on other computers. Because the only thing that changes is where the data comes from. DataEase LAN™ and DataEase Connect™ automatically get the information you need. No matter where it is—on another PC, LAN server, minicomputer or mainframe.

Creating complex business graphics is easy with DataEase GrafTalk.™ And DataEase Developer™ has everything you need to document and encrypt your applications and build demonstration disks. And, of course, it's easy too.

The DataEase Family. They can do everything. And everything they do is easy.

Send us the coupon for more about the DataEase Family, including a free DataEase demonstration disk. Or call 1-800-334-**EASE**, or 203-374-8000.

PC Wrld 3/87

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Circle 301 on reader service card

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Interior Design for Documents

A designer explains how to create documents that communicate effectively and deliver a powerful visual punch.

Marjorie Spiegelman

"Give us the tools and we will finish the job!" thundered Winston Churchill. That course of action may have been appropriate during a world war, but such a tack is risky in the arena of desktop publishing. Even the best tools don't guarantee that your documents will grab readers' attention or sway them as you intend. Unless you've mastered the basics of good visual communication, your message may be confusing, unappealing, or drowned in a sea of gray text.

Contrary to popular belief, you don't need to be an artist to be an effective designer. Good design involves analyzing your material, mastering a few simple mathematical relationships, and setting up a design framework. From there, you need only fit your material into the structure you've created—an approach that lends both consistency and flexibility to your work.

Matching Form to Function

A letterhead, a magazine ad, and an annual report serve different audiences, and the form each takes should reflect this difference. Thus, your first task in designing a document is to identify your audience. Are they readers or browsers? Professionals or novices? Sympathizers or skeptics? Even if the message stays the same, a different design may be appropriate for each audience. Lawyers, for example, are dedicated readers accustomed to seeing more type than white space on a page; a text-heavy document isn't likely to put them off. On the other hand, consumers reading a product brochure are browsers looking for useful information. They're more apt to read the brochure if it looks open, is inviting, and has strong visual focal points.

Another kind of audience might consist of technicians studying documentation. Like lawyers, they are readers; like consumers, they want information fast. They can tolerate smaller type if it's well organized and if the page has enough white space to give the eye some rest.

Once you've determined who your audience is, you need to categorize the information you want to communicate. If you're designing a newsletter, your categories might include the company logo, the newsletter title, headlines, bylines, text heads, text, lists, footnotes, captions, photographs, and other visual elements. Naturally, the most important elements should receive the most striking visual treatment.

Say you want to direct your company's employees to a newsletter article on new procedures for ordering office supplies—a subject unlikely to spark

much interest. Two design possibilities are shown side by side in Figure 1. The example on the left places a box containing the article smack in the middle of the page, in the hope of capturing readers' attention. However, the box distracts readers from the other article that surrounds it, resulting in a choppy, unattractive design. In the example on the right, the article about office supplies has been set off with a bold vertical rule and a change in typeface. The result is a cleaner, more attractive page with a strong pull toward the central article.

True Grid

An invisible matrix, called a grid, is the framework on which much printed material is designed. The grid is a master page that establishes the relationships among margins, columns, and the spaces between columns.

To set up an invisible grid, decide roughly what your *visible* page should look like. How many columns of text do you need per page? The most important information in a newsletter or brochure, for example, might be set two text columns per page, with supporting information set three text columns to a page. To accommodate both configurations, you can use a grid with six *base* columns. These base columns won't be text columns—they're too narrow—but they'll provide the underlying structure for your designs.

A grid with six base columns can do much more than just accommodate two or three columns of text, as the magazine you're holding illustrates. A single base column can be used for captions or labels; and photos or illustrations can be sized and positioned along four, five, or even six columns of the base grid.

Once you have an idea of how your page should look, you can develop actual measurements. Even if your page makeup program uses inches, you'll benefit by becoming fluent in *picas* and *points*, the basic measuring units of typography. Use the pica, which equals almost 1/6 inch, as the unit for horizontal measurement of type, and the point, which equals 1/12 pica, as the unit of vertical measurement.

Begin establishing the grid's measurements by deciding on the horizontal increments. An 8½-by-11-inch page measures 51 by 66 picas. You can fit a six-column grid into this space by making each base column 6 picas wide, with 1 pica of space between columns. The total width of all the columns' text area will be 41 picas, leaving 10 picas to be divided between the left and right margins.

Using left and right margins of equal size is easier for beginners, although in classical book design the bottom margin is commonly the largest, the outside margin next largest, the top margin smaller yet, and the inside margin smallest of all. Left and right

Mark Farbin

Table 1: Character count per pica*

Typeface	Point Size										
	6	8	10	12	14	16	18	20	24	30	36
Times Roman	4.77	3.57	2.86	2.38	2.04	1.78	1.59	1.43	1.19	.95	.79
Times Roman Italic	4.90	3.68	2.94	2.45	2.10	1.84	1.63	1.47	1.22	.98	.81
Times Roman Bold	4.48	3.36	2.68	2.24	1.91	1.67	1.49	1.34	1.12	.89	.74
Times Roman Bold Italic	4.75	3.56	2.85	2.37	2.03	1.78	1.58	1.42	1.18	.95	.79
Helvetica	4.48	3.36	2.68	2.24	1.91	1.67	1.49	1.34	1.12	.89	.74
Helvetica Italic	4.34	3.26	2.60	2.17	1.86	1.62	1.44	1.30	1.08	.87	.72
Helvetica Bold	4.07	3.05	2.44	2.03	1.74	1.52	1.35	1.22	1.01	.81	.67
Helvetica Bold Italic	4.13	3.10	2.48	2.06	1.77	1.55	1.37	1.24	1.03	.82	.68

* These figures assume a combination of uppercase and lowercase letters.

margins of 5 picas leave plenty of space for text and graphics and allow room for three-hole punching or other binding procedures.

Setting up vertical measurements is next on the agenda. Start by choosing your type size. A good standard for text is 10-point type, although sometimes 11-point type or larger helps attract the reader's eye to the page. Remember that text requires *leading*, or space between lines. For 10-point type, 2 points of leading is standard, resulting in a total measure of 12 points. This measurement is referred to as 10 on 12, or 10/12.

Align the zero points of the rulers in your page makeup program with the upper-left corner of the page. If you set the rulers to measure in picas and points, they will automatically mark off 12-point units along both dimensions of the page. But if your program doesn't have this capability, sketch out the grid by hand and use a pica ruler to mark off the lines. Even though some of the type you use will be smaller or larger than 10/12, you now have a skeleton on which to hang all text and graphic elements.

Establishing top and bottom margins is next. Your bottom margin should be about 5 picas; for variety, you can make the top margin slightly smaller. But don't skimp on margins—if they're too tight, the reader will feel crowded out. You also need to allow enough room for running heads and footers (such as page numbers, section titles, the publication name, and the date).

Once you've settled on the basic measurements of your grid, you can establish the size of the text columns. For legibility, text columns should accommodate at least 20 and no more than 55 to 60 characters per line. If a text column is too narrow, awkward line breaks and bad spacing may result; if it's too wide, the reader may have to slow down to follow the text.

To set up your text columns, you must know how many characters there are per pica given the point size of your type (see Table 1). Most 10-point type has approximately 2.5 characters per pica; a single 6-pica base column will fit only 15 characters and is too narrow for text type. However, two base columns and the space between them add up to 13 picas, which will accommodate 32.5 characters—a good medium-size column width for text. These measurements yield a grid with three text columns. For a grid with two text columns, use three base columns with 1 pica between columns for a total of 20 picas. This scheme accommodates 50 characters per column of text.

The Monthly Entertainer

For employees of Theatre Supplies, Inc. March 1987

News on What Sells

Who, What, When, and Why

A recent report by the Stage and Theatrical Association of Resellers (STAR) describes which types of products sell best at different times of the year. STAR reports that basic items like waxy face paint, ballet shoes, and leotards sell well at any time in most urban areas. But in the summer, when local theatrical companies are producing the works of Shakespeare and other playwrights in outdoor settings, we (and other resellers) sell greater quantities of filmy veils, rhinestones, codpieces, and taffeta.

Our sales to the non-theatrical market are the most active around Halloween and Christmas. Halloween partygoers browse through our merchandise looking for the ideal costume. Although we sell a lot of face masks and face paint then, it seems many shoppers are unsure about their final costume and view our diverse merchandise as a source of ideas. At Christmas, on the other hand, consumers come to us specifically for the ever-popular leotards and tap-style walking shoes.

The STAR report concludes that resellers can increase sales by about 10% by meeting these diverse needs with the latest merchandise. So when you consult with customers and prepare to place your orders during the different seasons of the year, be sure to keep these different needs in mind. If you want more information, you can peruse the STAR report at Gladys Marchand's desk.

Place Your Order, Please
New Forms Make It Easy

When you need the basics right away—pens, pencils, tape, scissors, staples, and other amenities of modern-day office life—you know how difficult and time-consuming it can be to order supplies. Up until now, we've all had to fill out the Supply Request Form in triplicate and wait up to a week to receive the supplies. But thanks to Burt Roberts, our new controller, there's a new and easier method. Simply call Burt by Monday afternoon with your order, complete with catalog number and price.

Burt will process the order and deliver the supplies to your door, via his assistant, by Wednesday morning. Note, however, that no late orders will be accepted, and that Monday is your only chance to order supplies for the entire week. Address any questions or comments on this new procedure to your department head.

Reminder: Inventory

Yes, folks, it's time once again for a storewide inventory. Now that you've groaned in anticipation, here's a nice incentive. After completing the inventory procedure Sunday evening, you can buy any in-house merchandise at cost. To save time on Sunday, pick out the items you want now, and prepare to take home a few armloads of goods.

A Few Tips on Preventing Theft

Because we stock so many small items and our shelves and

us at the moment to implement a sophisticated security system, there are a few simple techniques for preventing theft.

1. Shoplifters are most successful when the store becomes crowded. If you see someone wandering down a far aisle alone when things are busy, you may want to ask if you can help find something.

2. If you're too busy to check the far aisles, look up at the mirrors frequently, especially if you notice any sudden or suspicious movements.

3. Look carefully at all $20 bills! Unfold the bill and check both sides of it. A common scam is to try to pass off a $1 bill as a $20 by pasting over two of its corners with the corners of a $20 bill.

4. Shoplifters often work in pairs. While one member of the duo attempts to distract the salesperson, the other member pockets an item and leaves the store. Usually the members of these teams enter the store separately to avoid detection. The best way to prevent shoplifting teams from realizing their goals is

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Figure 1: This mock-up of a newsletter illustrates how to grab a reader's attention. In the example on the left, the block in the center interrupts the flow of text. By using a bold vertical line and a change in typeface, as in the example on the bottom, you can guide the reader's eye to the intended point of emphasis.

Be sure to test your grid before proceeding with any final design work. You can do this by hand or by using a page makeup program to make sketches. When you finalize the grid, draw it with the line tool in your page makeup program, print it out, and keep several copies of it near your computer. It's a handy reference tool, especially because base columns aren't always displayed on screen. Whenever you want to lay out a page, experiment by drawing thumbnail sketches on tracing paper placed over the grid (see Figure 2).

Tips on Type

The content of your publication—scholarly, educational, technical, whimsical—plays an important role in determining your choice of typefaces. For example, Courier, an IBM typewriter face, may bore people who often read typewritten text. Helvetica, a modern-looking sans serif style (lacking strokes on the ends of characters) is effective in small doses—in an ad or on a poster—but is difficult to read as text. Times Roman, a well-designed serif face, is elegant and familiar to most readers.

One typeface in various sizes and weights is sufficient even for publications with complex formats

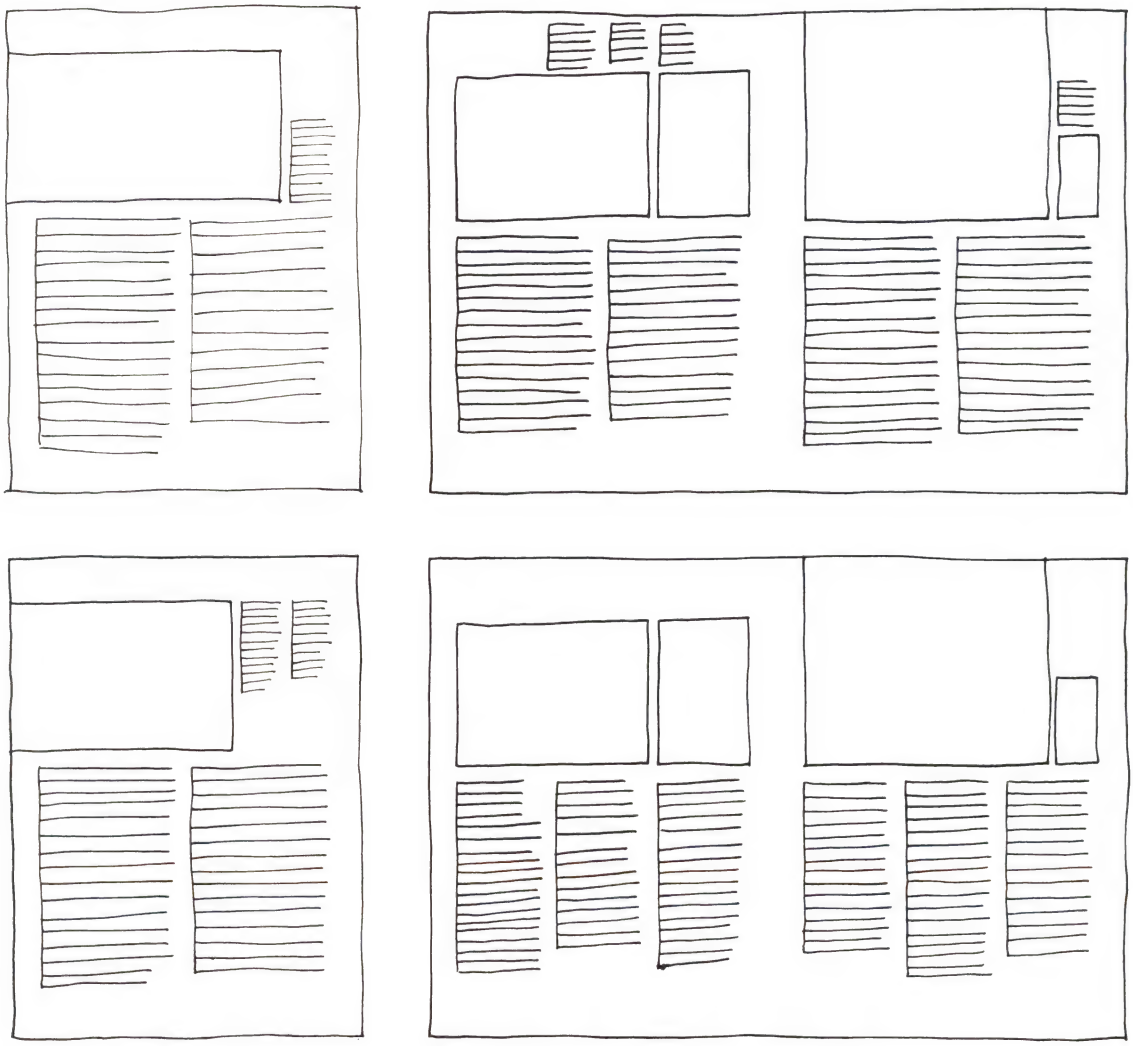


Figure 2: Creating thumbnail sketches such as these on tracing paper placed over your grid can help you develop a good layout for each document page.

(such as *PC World*). Of course, every rule has its exceptions: A sans serif typeface might stand out well when used for labels within illustrations.

You can communicate a wide range of information by varying type size and weight. In the newsletter shown in Figure 1, for example, several levels of information are conveyed using just one typeface in three sizes. The logo appears in the largest size on the page and the title in the next largest. The remaining elements—date, text and text heads, and captions—are all set in the smallest size but in different weights: Bold and italic type are used to signal a change in content, to emphasize a word in the text, or to set off an element.

Size Matters

To be distinct from one another, type sizes must differ by at least 2 points. For example, 9- and 10-point type are too close in size to be easily differentiated. If you use 10-point type for text and 9-point type for captions, one of the two sizes might look as though it were incorrectly typeset. But 10-point type (for text) and 8-point type (for captions) are clearly distinct and balance each other appropriately.

To maintain harmony among larger text elements, you can use the cap-height-to-*x*-height trick. If you have a 48-point title, for example, measure the height of the lowercase *x*. Your second element (such as a subtitle), should be sized according to that measurement (see Figure 3).

Rag, Rag, Rag

Resist the temptation to justify text. Instead, set it flush left, with a ragged right edge. Why? Because type is most legible when letter spacing and word spacing are constant. In an average brochure or magazine text column, word shapes are weakened by the extra spaces added to justify the right margin. Such irregular spacing slows the reader and obstructs the message.

Occasionally you may want to set text flush right with a ragged left edge. Headlines, subtitles, and pull quotes are sometimes more effective this way, and the white space around them can be an interesting design motif in itself. It may sound like heresy, but try ragging the bottoms of your columns, too. Uneven columns create interesting shapes; they also eliminate the problem of what to do when you have a widow—a short line of text dangling at the top of a column. With flexible column lengths, you needn't worry about cutting or adding text to even out the columns.

Getting a Grip on Graphics

Once you've established a grid, placing graphic elements is easy. Simply determine how tall and how many columns wide each graphic should be and in which column it should start. It's always helpful to sketch out a few design possibilites before working on screen. (For information on designing effective business graphics, see "Presentation Pointers," *PCW*, February 1986.)

Charts, tables, and line graphs are just the beginning. Plain or decorative rules can add emphasis, indicate starting points, and set off text elements. They also eliminate the need for boxes, which can interrupt the flow of text. Horizontal rules, combined with well-aligned type, set off text more smoothly (see Table 1).

A consistent style helps the reader stay tuned to your message. To guide your reader effectively, don't change caption style from illustration to illustration; don't mix arrow and bullet styles; and don't combine

Typography **Typography**

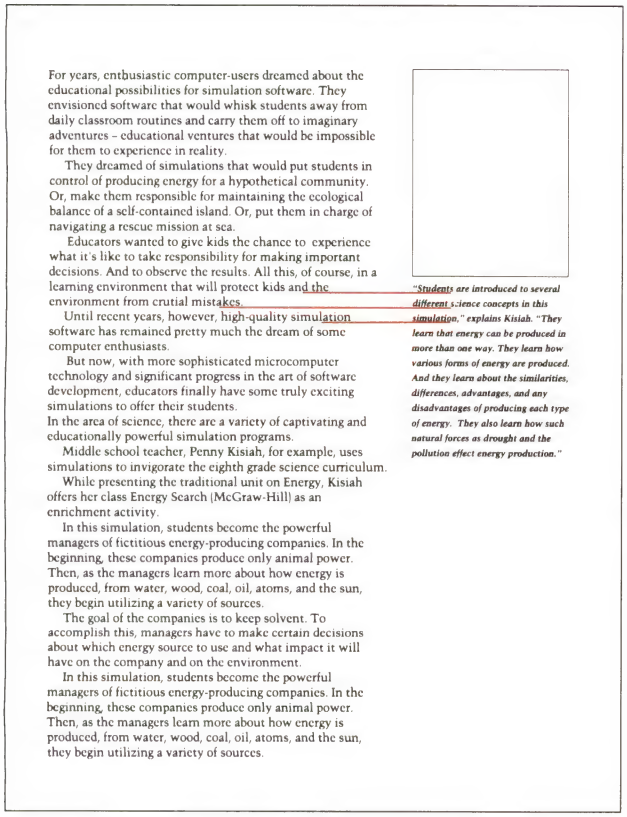
Typography

Its appeal comes from the understanding used in its planning

Figure 3: The cap-height-to-x-height trick is a handy guideline for determining how big a subtitle should be in relation to a title.

baroque rules with a modern typeface, such as Helvetica, unless the content of your publication warrants it. If you're comparing ancient Egyptian art to modern-day textile designs, for example, such a combination might be the very thing. Otherwise, such an arrangement could detract from the content of your publication.

Although laser printers are limited to black type, you can add color to graphics through offset printing—an economical method for large jobs. Note that light colors, like yellow and turquoise, are more difficult to read on light backgrounds than are dark hues, such as black and red. If you use color graphics, do so sparingly or your document will look cluttered and confusing.


For years, enthusiastic computer-users dreamed about the educational possibilities for simulation software. They envisioned software that would whisk students away from daily classroom routines and carry them off to imaginary adventures – educational ventures that would be impossible for them to experience in reality.

They dreamed of simulations that would put students in control of producing energy for a hypothetical community. Or, make them responsible for maintaining the ecological balance of a self-contained island. Or, put them in charge of navigating a rescue mission at sea.

Educators wanted to give kids the chance to experience what it's like to take responsibility for making important decisions. And to observe the results. All this, of course, in a learning environment that will protect kids and the environment from crutial mistakes.

Until recent years, however, high-quality simulation software has remained pretty much the dream of some computer enthusiasts.

But now, with more sophisticated microcomputer technology and significant progress in the art of software development, educators finally have some truly exciting simulations to offer their students.

In the area of science, there are a variety of captivating and educationally powerful simulation programs.

Middle school teacher, Penny Kisiah, for example, uses simulations to invigorate the eighth grade science curriculum.

While presenting the traditional unit on Energy, Kisiah offers her class Energy Search (McGraw-Hill) as an enrichment activity.

In this simulation, students become the powerful managers of fictitious energy-producing companies. In the beginning, these companies produce only animal power. Then, as the managers learn more about how energy is produced, from water, wood, coal, oil, atoms, and the sun, they begin utilizing a variety of sources.

The goal of the companies is to keep solvent. To accomplish this, managers have to make certain decisions about which energy source to use and what impact it will have on the company and on the environment.

In this simulation, students become the powerful managers of fictitious energy-producing companies. In the beginning, these companies produce only animal power. Then, as the managers learn more about how energy is produced, from water, wood, coal, oil, atoms, and the sun, they begin utilizing a variety of sources.

"Students are introduced to several different science concepts in this simulation," explains Kisiah. "They learn that energy can be produced in more than one way. They learn how various forms of energy are produced. And they learn about the similarities, differences, advantages, and any disadvantages of producing each type of energy. They also learn how such natural forces as drought and the pollution effect energy production."

Figure 4: To create visual harmony, the leading used in the caption mirrors that of the text column.

Spacing and Placement

Blank space carries meaning, just as text and graphics do. If you handle white space inconsistently, you'll confuse your audience. The space above and below text heads, for example, should always be the same in order to prepare the reader for a change in content. Similarly, the space between captions and illustrations and the space between captions and text should be constant; otherwise, readers won't know when a caption is a caption.

Effective placement of text and graphic elements guides readers through the text and adheres to the principal that we read from left to right. If you want your audience to begin reading on the left side of the document but you place a large bold headline on the right side, readers may not have a clear idea where to begin.

By varying the placement of different elements, you can create and sustain visual interest. For example, it's conventional to place a photo caption flush left under the photo. But if the photo is large, you can create a more interesting design by setting the caption flush with the next base column under the photo. Such an arrangement creates white space, which sets off the caption and adds energy to the whole page.

Similarly, you can create striking effects with leading. In Figure 4, the leading in the caption mirrors the line spacing of the text column and contributes to a smooth, parallel look.

Reaching Out With a Well-Designed Page

Far from restricting you, a standardized design system helps you order information and create arresting documents. Figure 5 illustrates a layout from the introductory issue of *Publish!* [*PCW*, July 1986] that was superimposed on a six-column base grid. The display type (used for titles and subtitles) is set flush right across the base columns and the lines are purposely broken to create a deep rag. The asymmetrical shape of this block pulls readers into the middle of the spread and then guides them back to the byline and the starting point of the text.

The angles on the left edge of the block of display type are picked up in the ragged right edge of the text columns. These elements reinforce one another, as does the angled dotted line that separates the illustration from the text.

The labels used for the illustration are set in italics and in smaller type than the text for clear dif-

Eye-Catching Pages

Beyond white space: mastering the basics of design

By Marjorie Spiegelman

If you've never so much as drawn a square box, you may feel hopelessly overwhelmed by the task of designing a page on a computer. It's so easy to get carried away by the choices of typefaces, type sizes, graphics, formatting. And too much of a good thing means confusion for you and for your readers.

Avoid the pitfalls by using some simple design rules. Far from limiting you, a design system liberates you from endless decision making and error correcting. The examples described here can be adapted to almost any printed material. The accompanying newsletter page illustrates the terms used.

Analyze the content. This involves more than merely reading the story=it means looking at it critically to decide which of its elements are more important than others. After you've determined your priorities, assign type sizes and styles to convey to the readers the levels of importance.

In most newsletter articles, the most important element is the headline, which distills the article's message into a few words. The headline should be the first and largest element. Next in importance is the subtitle, which supplements the headline; it's smaller and is the second element on the page. Subheads (short headlines that break up columns of text and signal a change in topic) are often the same type size as the text itself, with emphasis provided by boldface type.

Warning: Keep it simple. For example, if subheads are all different sizes, the reader won't know where to start.

Develop a grid, that is, a standard page structure. It helps you organize text and art on all your pages with consistency.

In page composition programs the basic grid is often referred to as the master page. It's made up of top, bottom, and side margins; columns; and the spaces between columns. Once you've established a master page format, you'll never have to "eyeball" elements on the screen (place them according to how they look rather than according to a measured format).

Perhaps the most important element in your grid or master page is white space, or empty space. White space creates a viewing ground for the information and adds visual interest. It also conveys information itself. If the amount or positioning of white space changes, readers expect a change in content.

Start defining your grid by standardizing your margins. On a typical newsletter page measuring 82 by 11 inches, the right and left margins should be equal=usually at least 32 picas wide. (Six picas equal 1 inch; a pica is divided into 12 points.) Top and bottom margins shouldn't be equal=the top is usually smaller than the bottom =and they must be consistent from page to page. An example for newsletters is 4 to 5 picas for the top margin and 5 to 6 picas for the bottom. Smaller margins make the page look crowded and uninviting.

Next, determine a column width. Generally, a newsletter page contains either two or three columns separated by 1 pica of white space. Use your column measure to size photographs, charts, and drawings. For example, in a three-column grid, graphics can be one, two, or three columns wide=not an arbitrary measure but one related directly to the grid.

Finally, decide on a type size for text. Generally, one of the most readable type sizes is 10 points, with 2 points of leading (white space between lines of type). In designers' and typesetters' language, this is called "10 on 12" and is often written "10/12." (The "12" comes from adding the 2 points of leading to the 10-point type measure. The total is called line spacing.)

Another advantage of 10/12 type is that because 12 points equal one pica, you can set up a system based on even multiples of picas. For example, the line spacing between text and subhead might be 24 points (2 picas) and the line spacing between the subhead and the text below it might be 12 points (1 pica). Paragraph indentations could all be 12 points, too. Simplifying the mathematical relationships reduces the number of design decisions you have to make; creates a stronger page, and leaves you free to experiment with graphics.

Prepare a thumbnail. A thumbnail is a miniature, preliminary sketch that shows the placement of text and graphics. It enables a designer to quickly determine how much room the text takes up and how much is left for graphics.

If you're eager for a finished product, you may be tempted to skip the thumbnail. Don't. Otherwise, you may find yourself on the last page of your newsletter with no text to put on the page. Before you do your thumbnail, format your text on screen at the proper type size, leading, and column width. If there is little copy, count the number of lines on screen; if your text runs for pages, count the lines on a printout.

Next, make your thumbnail sketch. Does the text fit into the space you've allotted? Is there enough room for charts, illustrations, photos? If you need more or less text, make the adjustments now.

You should also decide where illustrations will go. Try several thumbnails, putting the illustrations in different places. Remember that illustrations should be as close as possible to the text they depict.

Suppose you have a page with text but no graphics. How do you break up the monotonous columns of words? You might try a trick that adds visual variety and stimulates reader interest. A pull quote (also called a deck, readout, or teaser) is a provocative phrase or sentence pulled from the main text and reproduced in a larger type size. To set it off from the text, you might add plain or decorative lines or bars (also called rules) above, below, or next to the pull quote. One pull quote to a page is plenty.

These guidelines will help you create strong, simple, visually interesting pages that involve readers. They'll also streamline your production process so that you can spend more time on words and art.

Page Make-Over

Does your newsletter, memo, brochure, or report lack visual impact? We can help you do a complete page make over. Send us a copy of the page or pages. We'll select examples and show you how to improve your design. Send samples to Page Make Over, Publish!, 555 De Haro St., San Francisco, CA 94107.

Figure 5: A grid provides an underlying structure for designing a document, but that doesn't mean the document's design must be monotonous. Note how the placement of the title, the ragging of the columns, and the angled line of the illustration work together to spark visual interest.

ferentiation. To parallel the vertical edges of the illustration, the labels are positioned flush right in the third column of the base grid. This allows the labels and the art to function as a cohesive yet distinct unit.

The result is a clean, well-designed spread that relies on the grid as an ordering principle while arousing reader attention with interesting angles and shapes.

The look of a document depends heavily on your use of visual signals. One or two visual signals (such as a change in type size or in placement of text and graphic elements) per level of information is usually sufficient; the key is to create and maintain a clear, consistent look.

Using good design principles will get your message across more effectively. With hundreds of pieces of paper competing for your readers' time, a page that demands attention is certainly worth your efforts.

Marjorie Spiegelman is the designer of PC World, Macworld, *and* Publish! *and has taught design at the University of California.*

Money Managers—Bullish on PCs

In the three-ring circus of financial services, cutting-edge PC technology is far more than a sideshow—as some of the country's foremost money managers can attest.

Ronnie Gunnerson

It is only a modest exaggeration to say that Frank Mlynarczyk owes it all to the PC. The spectacular growth of Prospect Advisors, his small money-management firm in New York City, has largely been fueled by desktop computing.

Mlynarczyk and partner Ted Theodore opened for business in June 1985, with $1 million to invest. In less than 18 months, the two were managing assets in excess of $75 million. Mlynarczyk is convinced that he owes his firm's rapid expansion to two XTs and a Hewlett-Packard 150, which handle everything from word processing to information gathering via Dow Jones News/Retrieval.

Mlynarczyk and Theodore are hardly alone in their reliance on PCs. Deregulation of financial services has ignited fierce competition in the once-staid industry, which is now crackling with products and luring investors who hadn't previously ventured beyond a passbook account.

Seeking a competitive edge in this teeming new marketplace, money-management firms equipped with PCs are putting financial analysis at their—and occasionally their customers'—fingertips. Figures from the market research firm Future Computing reveal that banks and financial institutions have installed more than half a million PCs and that accounting firms have put another 368,000 machines to work.

PCs have chugged through the usual word processing and spreadsheet tasks for some time, but change is afoot. Technologies such as real-time data access, optical storage and retrieval, local area networks, graphics environments, and expert systems are arriving, and trailblazers like Mlynarczyk and Theodore are embracing such innovations enthusiastically (see the sidebar "CD ROM Lights Up").

Real-Timely Information

Access to up-to-the-second data is an obvious plus in an industry where a little time can mean a lot of money. Until recently, real-time stock market quotes flashed across only Reuters, Telerate, or Quotron dumb terminals fed by a mainframe. Budding firms like Prospect Advisors were required to pony up for costly time-sharing arrangements to access that data.

But with the advent of systems like Lotus Signal, a hardware/software hybrid that captures quotes via FM sideband transmission and feeds them directly to *1-2-3* or *Symphony* worksheets, retrieving financial data in real time became feasible for smaller firms (see "Data on Your Dial," *PCW*, February 1986).

Joyce Rand

Real-time data paid off for New York money managers Frank Mlynarczyk and Ted Theodore.

CD ROM Lights Up

The data-hungry financial marketplace may soon be lapping up compact disk read-only memory (CD ROM) storage devices in unprecedented numbers.

There is, after all, an ideal match between money management, with its constant glancing over the shoulder, and CD ROM—where the orientation is toward historic company data, not real-time data. The coming generation of half-height CD ROM drives capable of running off the PC's power supply will, according to Link Resources analyst Steven Seick, "provide a workstation component that is economical in both cost and space requirements." Seick suggests that CD ROM may serve as the preferred medium for accessing information now available via time-sharing from offerings like Quotron's Financial Database Service.

Declaring that "financial services professionals need an almost infinite amount of information," software heavyweight Lotus Development introduced One Source, its own CD ROM system, last fall. Combining the player, analysis software (tightly knit to Lotus spreadsheets), and up to eight financial data bases delivered weekly on CD ROM, the tab for One Source runs from $11,000 to $27,000 annually. One Source serves as a data repository extending back 20 years and also provides access to Value Line investment advice and Compustat financial statistics.

"With CD ROM we're putting the largest financial data bases—data that today is only available in its complete form on a mainframe—right on the desk," says Larry Moore, president of Lotus Information Services. "Users can get at that data from within *1-2-3* about 100 times faster than through the mainframe. You can pull up 8000 data items on a single company in 6 seconds or pull up 20 years of sales figures for two companies and create a comparative report in about 3 seconds."

Lotus arrived on the scene some time after Datext of Woburn, Massachusetts. Datext markets CD/Corporate, a CD ROM product, to the financial services community. CD/Corporate consists of the drive, a cable, and an interface board for an XT or an AT, plus an annual subscription to a core collection of information on some 10,000 publicly traded companies.

According to Datext marketing vice president Tim McManus, CD/Corporate combines information from six commercially available data bases, offering financial statement data, full texts of investment reports, bibliographic abstract information, stock prices, and executive biographies. Annual subscription fees range from $9600 to $19,600.

McManus predicts that widespread use of hybrid systems that combine access to on-line information with mass storage devices isn't far off. In an attempt to fulfill that prophecy, Datext has introduced an enhancement to CD/Corporate called CD/NewsLine, which serves as a pipeline to Dow Jones News/Retrieval. *—R. G.*

At Prospect Advisors, Signal works with one XT. The second XT runs another real-time package, the *Bridge Market Data System,* which the partners prefer for its ability to graph stock performance. The two XTs are linked by an intelligent communications device from Bridge Market Data.

Mlynarczyk works primarily with Signal, monitoring prices throughout the day and periodically updating portfolios. Theodore concentrates on the *Bridge* real-time system, which serves as his gateway to the Dow Jones News/Retrieval service and to historical data on trading patterns of individual stocks. Using the *Bridge* system's language, Theodore creates custom graphs that can chart stock activity as far back as ten years.

Taking advantage of Signal's automatic data feed into *Symphony,* the partners can evaluate portfolios and hone their market intelligence. Noting that he now boards the subway with reports in tow, Mlynarczyk observes, "We go home at night knowing how well we did."

A PC Intrapreneur

J. B. Maxwell has reaped a comparable harvest from the PC. Maxwell, a financial planning vice president with Dean Witter Reynolds in Boston, has boosted his clients' returns and upped his own compensation significantly since automating his work.

Maxwell relies on a Compaq Portable and a Leading Edge PC—both outfitted with 640K and 20MB hard disks. Inside the Compaq is Natural MicroSystems' Watson, an internal modem capable of sending and storing voice messages. Watson regularly spreads the word of Maxwell's upcoming client seminars.

Signal is one of the nine applications in Maxwell's library. He uses the Lotus package to set outpoints—predetermined selling prices, equivalent to stop-loss provisions, that aim to preserve a client's capital.

As Maxwell explains, "Without automatic outpoints, traders miss many trades. By presetting outpoints, Signal automatically monitors all security positions across all portfolios and lets you know when to trade. For example, when a lot of 100 shares reaches an outpoint, the computer beeps, the stock is worth more, and I have a commission."

Also in Maxwell's quiver is *Client Tell,* a customer account tracking package from William Pavlick, Inc. When Signal flags an outpoint, a bridge between the two programs (developed jointly by Lotus and Pavlick) automatically generates a report that Dean Witter accepts for internal bookkeeping purposes. According to Maxwell, each time a new ticker symbol is entered into *Client Tell,* the bridge automatically updates Signal's symbol file. "When you pull up a client's account during the day, the system gives you current values for that portfolio so you can view unrealized gains and losses on a real-time basis," he says.

Client Tell enables Maxwell to quickly contact all clients interested in a particular area—convertible bonds, for instance. "The program will automatically retrieve a list of clients, dial a specific prospect, and display the portfolio on the screen," Maxwell says. "It allows my staff and me to spend more time researching positions, talking to clients, and doing things other than addressing envelopes."

Maxwell has set up similar systems for three brokers in his firm, and two other brokers have built systems using Maxwell's as a model. Based on his experience, each is likely to witness a 25 to 30 percent increase in business.

PCs: To Invest or Not to Invest

Ample payoffs from his system notwithstanding, J. B. Maxwell is on his own at Dean Witter as far as personal computing is concerned. To date, the brokerage giant has adopted no companywide strategy for PC acquisition or implementation. According to Sharon Rosenberg, assistant vice president of marketing technology, Dean Witter account executives pay for hardware and software out of their own pockets.

Drexel Burnham Lambert is sold on Signal as a way to access real-time data but remains one of only a few investment houses to endorse it in a major way. The firm's mergers and acquisitions department installed the system almost a year ago. As a rule, however, Signal-type offerings are rarely implemented en masse. As Prudential-Bache Securities vice president Sam Blumenstyk puts it, "Many in the financial sector already have extensive relationships with marketers of financial information. Traditional vendors fulfill a lot of the needs that Signal also meets."

Beyond a specific product like Signal, E. F. Hutton and Merrill Lynch are pushing the limits of PC

Running customer account tracking software along with several other PC applications, Boston broker J. B. Maxwell improved results for his clients and himself.

Richard Howard

technology, particularly in the area of transaction processing. At E. F. Hutton, real-time data, local area networks (LANs), and artificial intelligence applications are either in place or on the drawing board. The firm is currently rolling out its Advanced Workstation for the Executive project, which will supplant the more than 10,000 terminals now in use. Based on an NCR AT-compatible system, this workstation is the linchpin of a strategy to integrate data bases that reside at Hutton's branch, regional, and corporate offices.

Hutton plans to link workstations via Starlan local area networks and connect networks to branch systems with gateways. This ambitious effort to network brokers should ensure data consistency and increase access to real-time data throughout the company, according to Bernard A. Weinstein, vice president in charge of information systems and communications for the brokerage house.

Hutton brokers can already tap into several data bases on their departmental systems, but few are exploiting those systems to maximum effect. "You have to be an expert at the system," Weinstein says. Enter personal computers. "We see the PC as a way of repositioning our brokers," says Weinstein. "It will change how the firm functions."

For starters, brokers will be freed from performing routine monitoring of the market, thanks to a package—now in development—designed to elevate the workstation to an expert system. The system will alert brokers to news or to unusual price movement on securities of interest; brokers, in turn, will be able to weigh alternative strategies by answering a series of pointed questions.

Says Weinstein, "The system might ask 'Do you want to see what customers hold XYZ stock?' then segue to the next question, like 'Do you want to see

Hutton's latest opinion of XYZ?' The system itself will serve as a road map to its use."

Merrill Lynch, meanwhile, is pioneering a system called the Merrill Lynch Municipal Trading System (MTS), implemented on ATs running *Microsoft Windows*. MTS will serve Merrill Capital Markets trading desks located throughout the United States. According to a Merrill Lynch spokesperson, MTS will help integrate local inventory data, remote data bases, computer-based financial analysis tools, and interoffice messages at the securities trader's workstation.

Connectivity is key to the Merrill Lynch strategy. Novell Advanced NetWare LANs already connect PCs within eight departments, according to Laurie Antonell, manager of office systems for the firm's computer operations group. Many more links are in the offing.

Last July six Novell file servers were installed at the World Financial Center in Manhattan, Merrill Lynch's new home. To keep the trading floor free of clutter, ATs will be shared behind the scenes, with one for every 14 trading positions. Each trader will be able to access an AT via a generic Rich, Inc., workstation connected through a switch. Eventually, says Antonell, "everyone at the World Financial Center will be connected."

Greater Net Effect

Merrill Lynch is hardly the only financial services provider enthusiastic about the real-time benefits of PC networks.

Standard & Poor's debt rating division moves *MultiMate* documents, news items, and mail messages over two Nestar LANs running the electronic mail program *cc:Mail*. Analysts transmit their reports to editors of Standard & Poor's weekly newsletter, *CreditWeek*, and its daily electronic publication, *CreditWire*, which goes to commercial news services.

This S&P division encompasses five floors, embraces five departments, and employs about 300, with 150 on each network. Each LAN hosts four mammoth file servers and a backup unit.

All users can access a divisional mainframe-based administrative and debt rating system, but not everyone requires the same decision-support information. Accordingly, smaller industry-specific data bases for modeling and financial analysis reside on the servers. "When oil and gas industry analysts log on to their systems, for example, they see a menu others don't see," explains Julio Menendez, the division's business systems director. Although productivity gains haven't been quantified, he suggests that the net's ability to supply otherwise inaccessible data has bolstered the division's performance.

Menendez is particularly smitten with *cc:Mail*. "Besides sparing us the need to walk floppy disks between floors, *cc:Mail* reduces the number of phone calls it takes to reach someone. It also enables us to communicate with the main data center through the PC."

Drexel Burnham Lambert has installed three Novell networks, and a fourth is on the way. John Ladyzinski, vice president of corporate finance, says the firm's goal is to download data from time-sharing services like Compustat, combine that data with proprietary information, and supply analysts with a smartly formatted finished product—24 hours a day. That ambitious project is nearly complete, Ladyzinski reports.

The Financial Expert

The financial community may be paying attention to E. F. Hutton's forays into PC-based expert systems. The Big Eight accounting firm of Coopers & Lybrand is another firm to watch: Its Decision Support Group has developed a knowledge-based expert system called *ExperTAX*. Designed to support the corporate tax accrual and planning process, *ExperTAX* "brings the expertise of 30 Coopers & Lybrand tax professionals to every audit job," according to Harry Schatz, Decision Support Group manager.

ExperTAX is based on an in-house expert system shell written in Golden Common LISP and designed to generate questionnaire-based expert systems. The program functions as an "intelligent" survey form that leads auditors through an information-gathering process. It asks only questions relevant to the client situation, sifts through issues that require clarification, and requests additional information when needed. It even explains to the auditor why a question is posed. *ExperTAX* has been in use since the summer of 1986, and company auditors, Schatz says, "are smiling."

ExperTAX consists of about 3000 "frames" and runs on PCs and compatibles equipped with 640K and hard disks. "Each frame is a piece of information," Schatz says. "*ExperTAX* is made up of both question frames and issue frames. The question frames contain all the information needed for the system to formulate the questionnaire. The issue frames, on the other hand, contain information required to analyze the answers."

Additional PC-based expert systems are in prototype at Arthur Andersen & Co. and at the Robotics and Microcomputer Instrumentation Laboratory at the Georgia Institute of Technology. At Georgia Tech, professor John W. Gowens is focusing on financial and business applications. One system analyzes financial statements, another handles project management work, and a third targets insurance underwriting and claims analysis.

While few PC expert systems other than *ExperTAX* are currently available, Gowens predicts a "huge market" in the financial sector, where expertise can be transformed into dollars. Still, Gowens acknowledges, expert systems do raise ticklish questions. "People are aware of the technology but are skeptical that it can work for them. What's more, they're afraid of being replaced by it. For that reason, we're trying to create a relationship between the human and the machine in which the individual remains dominant but is assisted by the machine."

State of the ART

Even though they may not be hawking full-blown expert systems, some old-line financial information vendors are showcasing dazzling new technologies. One such package hails from Reuters, the venerable global news organization that has long been a source of real-time financial data. Last May the company unveiled an AT-based workstation called the Advanced Reuter Terminal (ART). True to its name, ART is distinguished by a colorful graphics-oriented user interface.

Like Merrill Lynch, Reuters has based its system on *Microsoft Windows*. ART combines Reuters proprietary software with a run-time version of *Windows* to consolidate multiple data sources on a single high-resolution monitor. ART enables a currency trader to examine up to five trade-by-trade graphs of specific currencies while simultaneously viewing a full page of price data from Reuters's Monitor System in a separate window.

"At the bottom of the display, the trader can also read the latest headlines that pertain to those currency markets," says Mike Reilly, Reuters investor relations manager. "If the price of oil drops dramatically, or the Bank of England lowers its lending rate, that information instantaneously appears on the screen along with the prices."

ART provides some ability to analyze a good trade, and additional analysis capabilities will be built into subsequent applications, according to Reilly. ART also offers news search-and-retrieval talents that Reuters's current page-based information system simply cannot equal. Eventually, says Reilly, other applications will be added to the *Windows* display and keyword search functions.

Other Voices, Other Rooms

Voice technology is a resounding hit within the financial community, but PCs have yet to play a major role in that technological boom. So says Steven Seick, vice president of electronic services for the market research firm Link Resources.

The last two years have seen a dramatic rise in what Seick refers to as audiotex services: "the interactive delivery of information in speech format using the touch-tone phone as the terminal." Dun & Bradstreet and Dow Jones have launched products that use the technology, and Seick estimates that Dow Phone—the Dow Jones vehicle—now receives several thousand calls each day.

But despite the availability of some 40 PC-based voice products, from the Watson board to sophisticated "telecomputers," most of the action is handled by remote data bases residing on mainframes or minis. Observes Link analyst Bill Reed, "The financial market for the most part is still leery of voice technology. The vocabulary is limited, and most traders aren't yet comfortable communicating with customers electronically."

Like voice, other promising technologies must hurdle some real-world obstacles. Local nets, though they use a relatively mature technology, face barriers that are typical.

And like users throughout the PC community, money managers are hamstrung by a dearth of network-specific financial applications. Says Denny Wayson, head of professional support systems for Bank of America, "While we have LANs in pilot in local work-group environments, our primary concern is not with how neatly we can connect our computers but with the kinds of applications that can be delivered over networks. The software industry has a long way to go before it understands how groups can interact within their systems."

Nonetheless, news travels quickly in the financial community—and that includes news about how to work as well as about what to buy. In the long run, the measurable results of individuals like J. B. Maxwell and firms like Prospect Advisors are certain to provide compelling reasons for underwriting new PC technologies. As Georgia Tech's John Gowens sums up, "When the machine takes care of routine processes, the human being is free to think on a higher level."

Ronnie Gunnerson, a freelance author based in Los Angeles, writes frequently on personal computer issues.

Bridge Market Data System
Bridge Market Data, Inc.
10050 Manchester Rd.
St. Louis, MO 63122
800/325-3282 or 314/821-5660
List price: terminal emulation package $125; peak time $60/hour, nonpeak time $12/hour
Requirements: 256K, one disk drive, DOS 2.00 or later version, modem

cc:Mail
PCC/Systems, Inc.
480 California Ave. #201
Palo Alto, CA 94306
415/321-0430
List price: ten-user starter kit $995
Requirements: network running DOS 3.10
Not copy protected

CD/Corporate
Datext, Inc.
444 Washington St.
Woburn, MA 01801
617/938-6667
Cost: $9600 to $19,600 annually
Requirements: 512K, hard disk, DOS 2.00 or later version

Client Tell
William C. Pavlick, Inc.
310 Belmont Ave.
West Hempstead, NY 11552
516/485-2865
List price: $1000
Requirements: 128K, two disk drives (256K and hard disk recommended), DOS 2.00 or later version
Not copy protected

One Source
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
617/577-8500
Cost: $11,000 to $27,000 annually
Requirements: 640K, 10MB hard disk, DOS 2.00 or later version, one expansion slot, 1-2-3 release 2

Signal
Lotus Information Network Corp.
1900 S. Norfolk St.
San Mateo, CA 94403
800/762-7538
List price: $595
Requirements: 384K, DOS 2.00 or later version, serial port, 1-2-3 or Symphony

Watson
Natural MicroSystems Corp.
6 Mercer Rd.
Natick, MA 01760
617/655-0700
List price: $498
Requirements: 192K, hard disk, DOS 2.00 or later version

We quell qual

✓ **denotes IBM-AT compatibility.**
★ **denotes IBM-PCjr compatibility.**
CP—copy-protected; **NCP**—not copy-protected.

SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

Alpha Software ... NCP
★✓Keyworks 2.0 ..... $49.
★✓Alpha/three 1.0 ..... 223.
Application Techniques ... NCP
✓Pizazz 1.0 ..... 35.
Ashton-Tate ... NCP
✓dBase III Plus 1.1 ..... call
✓Framework II 1.1 ..... call
★✓Sign-Master 5.1 *(CP)* ..... 149.
✓Diagram-Master 5.01 *(CP)* ..... 199.
★✓Chart-Master 6.2 *(CP)* ..... 229.
✓Map-Master 1.0 *(CP)* ..... 239.
★✓MultiMate 3.31 ..... call
✓MultiMate Advantage 3.6 ..... call
Best Programs ... NCP
✓PC/Tax Cut *(1987 vers. for 1986 taxes)* . special
Bible Research ... NCP
★✓THE WORD 3.1 *(KJV Bible)* ..... 159.
★✓THE WORD 3.1 *(NIV Bible)* ..... 159.
Borland International ... NCP
★✓Turbo Tutor 2.0 ..... 24.
★✓Turbo Database Toolbox 1.2 ..... 41.
★✓Turbo Graphix Toolbox 1.0 ..... 41.
★✓Turbo Editor Toolbox 1.0 ..... 41.
★✓Turbo Lightning 1.0 ..... 59.
★✓Word Wizard 1.0 ..... 41.
★✓Turbo Pascal 3.0 w/BCD & 8087 support .. 59.
★✓Turbo Pascal w/Turbo Tutor ..... 75.
★✓Turbo Prolog 1.1 ..... 59.
★✓Turbo Family Jumbo Pack ..... 187.
★✓Sidekick 1.5 ..... 51.
★✓Traveling Sidekick 1.0 ..... 43.
★✓Traveling Sidekick w/Sidekick ..... 73.
★✓Reflex 1.1 ..... 87.
★✓Reflex Workshop 1.0 ..... 41.
★✓Superkey 1.1 ..... 59.
BPI Accounting ... NCP
★✓General Accounting C.13 ..... 299.
Breakthrough ... NCP
✓Timeline 2.0 ..... 239.
Broderbund ... CP
★✓Print Shop ..... 35.
★✓Print Shop Companion ..... 33.
★✓Graphics Library 1 ..... 22.
★✓Graphics Library 2 ..... 22.
Chipsoft ... NCP
★✓Turbo Tax 4.0 *(1987 version for 1986 taxes)* 45.
Computer Associates ... NCP
★✓SuperCalc 4 1.0 ..... call
Consumers Software ... NCP
✓Spreadsheet Auditor 3.0 *(check your work)* 89.
Dac Software ... NCP
✓Dac Easy Port ..... 19.

PC Connection Software Special
through March 31, 1987

BEST PROGRAMS ... NCP
✓PC/TaxCut

Feel overtaxed this time of year? Have we got a deal for you. PC/TaxCut has just had its price decreased without losing any of the features that put it where it is.

- Includes tax preparation program with over 25 different forms and schedules
- Also includes a tax planning feature that conforms to the new 1987 IRS guidelines
- Provides full printed returns, ready for you to sign and send in
- Works alone or in conjunction with PC/Professional Finance Program (data can be transferred directly—no re-keying necessary)

For the IBM PC, XT, or AT ..... $47.
PC/Professional Finance Program (PFP II) ..... also $47.
Even better! Buy both for only ..... $91.

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✓Dac Easy Payroll ..... 32.
★✓Dac Easy Accounting ..... 45.
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✓XTREE 2.0 ..... 34.
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5th Generation ... NCP
✓Fastback 5.13 ..... 89.
Generic Software ... NCP
✓Generic CADD 2.0 ..... 69.
✓Dot Plot ..... 18.
✓Auto Dimensioning ..... 35.
Harvard Associates ... NCP
★✓PC LOGO 2.0 ..... 89.
Infocom ... NCP
✓Cornerstone 5.2 ..... 59.
Lifetree ... NCP
★✓Volkswriter Deluxe Plus 1.0 ..... 69.
✓Words & Figures 1.01 ..... 129.
★✓Volkswriter 3 1.0 ..... 147.
Micro Education (MECA) ... CP
★✓Managing Your Money 3.0 ..... 115.
★✓Managing the Market 1.0 ..... 85.
Micropro ... NCP
★✓WordStar 3.31 ..... 179.
✓WordStar Propak 3.31 ..... 259.
✓WordStar 2000 Plus Release 2 ..... 285.
Microrim ... NCP
✓R:base System V 1.1 ..... 359.
Microsoft ... NCP
✓Windows 1.03 ..... 65.
★✓Multiplan 2.01 ..... 119.
★✓Microsoft Chart 2.02 ..... $189.
★✓Microsoft Word 3.1 ..... 279.
★✓Microsoft Project 3.0 ..... 239.
LANGUAGES
✓Quick Basic 2.0 ..... 59.
★✓Macro Assembler 4.0 ..... 97.
★✓Pascal Compiler 3.3 ..... 175.
★✓Fortran Compiler 3.31 ..... 229.
★✓C Compiler 4.0 ..... 279.
Microstuf ... NCP
★✓Crosstalk XVI 3.61 ..... 95.
✓Remote 1.3 ..... 95.
Migent Software ... NCP
✓Ability 1.0A ..... 65.
Monogram ... NCP
★✓Dollars & Sense 2.0 ..... 105.
Nantucket Software ... NCP
✓Clipper *(Autumn '86)* ..... 349.
Nolo Press ... NCP
★✓WillWriter 1.0 ..... 35.
Paperback Software ... CP
★✓VP-Planner 1.3 ..... 57.
★✓VP-Info 1.0 ..... 57.
Personics ... NCP
✓SmartNotes 1.4 ..... 49.
Peter Norton ... NCP
★✓Norton Commander 1.0 ..... 39.
★✓Norton Utilities 3.1 ..... 57.
Quarterdeck ... NCP
✓DESQView 1.3 ..... 65.
Simon & Schuster ... NCP
★✓Webster's New World Speller 1.3 ..... 39.
★✓Webster's New World Thesaurus 1.0 ..... 43.
★✓Webster's New World Writer 1.01 *(includes Thesaurus & Speller)* ..... 109.
Softlogic Solutions ... NCP
✓Double DOS 4.0 *(PC concurrency)* ..... 33.
✓Software Carousel 2.0 ..... 33.
✓Disk Optimizer 2.0 ..... 35.
Software Publishing ... NCP
✓PFS First Choice 1.0 ..... 97.
✓Personal Publisher 1.0 ..... 109.
✓Professional Write 1.0 ..... 119.
✓Professional File 1.0 ..... 149.
✓Harvard Presentation Graphics A:01 ..... 239.
✓Harvard Total Project Manager 1.12 ..... 287.
Springboard ... CP
★✓Certificate Maker ..... 34.
★✓Newsroom ..... 35.
★✓Clip Art Volume 1 *(for Newsroom)* ..... 19.
★✓Clip Art Volume 2 *(for Newsroom)* ..... 25.
✓Newsroom•Pro *(NCP)* ..... 79.
Symantec ... NCP
✓Q & A 2.0 ..... 219.
True BASIC, Inc. ... NCP
★✓True BASIC 2.0 ..... 109.
✓True BASIC Libraries ..... *each* 32.
Turner Hall ... NCP
✓SQZ! 1.5 *(for Lotus compactness)* ..... 49.
✓Note-It 2.0 *(notes on spreadsheets)* ..... 49.
WordPerfect Corp. ... NCP
✓WordPerfect Library ..... 59.
★✓WordPerfect 4.2 ..... 239.

For the IBM-PC (XT & AT) *Exclusively.*

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PC Pastimes.

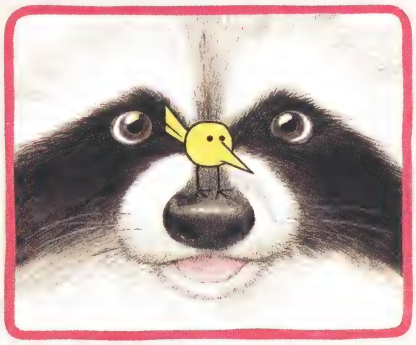
The play's the thing.

For years, industry fuddie duddies have been trying to figure out the extraordinary attraction of our industrious fuzzy wuzzies. How, they ask themselves, did a bunch of small tree-climbing carnivorous mammals manage to metamorphose the miniature maildrop of Marlow, NH (pop. 545) into a micro mail-order monolith?

Well, our masked mascots aren't too concerned with the secret of their success—they're too busy enjoying themselves. And so are we. Because helping you put together perfect PC systems (at superlative prices) is our idea of a good time.

Everybody wins.

We know it's no fun struggling late into the night with an obsolete program when you could be snuggling up to your favorite furry friend. Or tearing your hair out over some incomprehensible installation when you could be enjoying some innocent interlude. That's why we sell only the latest versions of products at the lowest prices, and make sure that you have everything you need to get up and running. We even have a special tech support number (1-800-PCC-TECH) staffed by perpetually positive-thinking pros who can make any set-up a pleasure.



Give your PC the bird—with *Hopper*. Together at last with *PC Man*, on one disk. Offer not available to net accounts. Limit one per customer.

Get on the (joy) stick!

We know there's nothing like taking a break from the Great American Novel or Ultimate Spreadsheet to indulge in a little light electronic amusement. So we're offering a free copy of our very own *PC Man and Hopper* to anyone who places a $500 order between now and March 31.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock.

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Everex ... 1 year
Evercom II 1200 Internal Modem ..... $129.
Evercom II 2400 Internal Modem ..... 235.
5th Generation ... 6 months
Logical Connection Print Buffer 256k ..... call
Hayes ... 2 years
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Smartmodem 1200B *(w/Smartcom II)* ..... 349.
Smartmodem 1200B *(no software)* ..... 319.
Smartmodem 2400 ..... 589.
Smartmodem 2400B *(w/Smartcom II)* ..... 529.
Smartcom II 2.1 *(software)* ..... 89.
Hercules ... 2 years
Hercules Color Card ..... 159.
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Above Board PC 64k *(upgrades to 2 Meg)* .. call
Above Board AT 128k *(upgrades to 2 Meg)* .. call
Above Board PS-PC 64k C/S/P ..... call
Above Board PS-AT 128k S/P ..... call
Inboard 386/AT *(for IBM-AT)* ..... call
8087 *(for IBM-PC & XT)* ..... 114.
8087-2 *(for 8 Mhz PC compatibles)* ..... 159.
80287 *(for IBM-PC AT & XT 286)* ..... 195.
80287-8 *(for 8 MHz AT compatibles)* ..... 249.
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* Masterpiece Remote ..... 119.
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Joystick Adapter Card ..... 29.
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Multisync monitor *(EGA compatible)* ..... 589.
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NSI Logic ... 3 years
Smart EGA ..... 299.
Orchid Technologies ... 2 years
Tiny Turbo 286 ..... call
PC Turbo 286e w/1 Meg ..... call
Turbo EGA ..... 589.
Princeton Graphics ... 1 year
MAX-12E Amber monochrome monitor ... 179.
* HX-12 RGB monitor *(690 x 240)* ..... 449.
Quadram ... 1 year
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Microfazer Printer buffer 64k *(parallel)* ..... 159.
Microfazer II Printer buffer 64k ..... 249.
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SMA ... 30-day money-back guarantee
PC-Documate Keyboard Templates:
DOS/Basic 3.0-3.1 — WordStar
Lotus 1-2-3 — WordStar 2000
Symphony — MultiMate
dBase III — WordPerfect
..... *each* $12.
Toshiba ... 1 year
P321 S/P printer *(80 col., 216 cps)* ..... 479.
P351 S/P printer Mod 2 *(136 col., 288 cps)* 1049.
Toshiba T1100 PLUS Laptop Computer .... call
Toshiba T3100 Laptop Computer ..... call
Tseng Labs ... 1 year
EVA 480 *(supports 640x480 resolution, includes Dr. Halo II & drivers for Autocad & Lotus 1-2-3)* ..... 399.
Video 7 ... 2 years
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DRIVES

I2 Interface ... 1 year
20 Meg Hard Drive Card *(85 ms)* ..... 429.
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Bernoulli Box 20 Meg w/PC2 card ..... 1849.
10 Meg cartridge ..... 57.
Bernoulli Box 40 Meg w/PC2 card ..... 2449.
20 Meg cartridge ..... 79.
PC2B (Bootable) Card ..... 229.
Mountain Computer ... 1 year
Drive Card 20 Meg *(80 ms)* ..... 519.
Drive Card 30 Meg *(78 ms)* ..... 589.
Seagate ... 1 year
20 Meg Internal Hard Drive *(w/Western Digital controller and cables, 65 ms)* ..... 389.
30 Meg Internal Hard Drive *(w/Adaptec RLL controller and cables, 65 ms)* ..... 489.
Tandon ... 1 year
New Business Card 20 Meg *(85 ms)* ..... 399.
TEAC ... 1 year
PC, XT 360k Drive *(5¼" half-height)* ..... 109.
Toshiba ... 1 year
PC, XT 360k Drive *(5¼" half-height)* ..... 109.
AT 360k Drive *(5¼" half-height)* ..... 117.
Western Digital ... 1 year
File Card 20 Meg *(w/XTREE, 80 ms)* ..... call

MEMORY

64k Upgrade Set *(150 ns, set of 9)* ..... 15.
256k Upgrade Set *(150 ns, set of 9)* ..... 35.

DISKS

All disks have a lifetime warranty.
DS/DD Disks for the PC & XT (40 TPI).
* Verbatim Datalife *(10 disks per box)* ..... 15.
* Maxell MD-2 *(10 disks per box)* ..... 19.

DS/High Density Disks for the AT (96 TPI).
Fuji *(10 disks per box)* ..... $27.
Verbatim *(10 disks per box)* ..... 29.
Maxell *(10 disks per box)* ..... 29.

3½" Double-sided Diskettes *(720k)*
For Toshiba and IBM laptops.
Verbatim *(10 disks per box)* ..... 26.
Sony *(10 disks per box)* ..... 26.
MAXELL *(10 disks per box)* ..... 26.
3M *(10 disks per box)* ..... 27.
BASF *(5 disks per box)* ..... 14.

MISCELLANEOUS

Automation Facilities
* Floppiclene Disk Drive Cleaner ..... $18.
* **Compuserve Information Service** *(includes subscription, manual, $25 usage credit, monthly publications)* ..... 24.
* **Dow Jones** Membership Kit ..... 24.
Environmental Software
Nylon Computer Covers PC, XT or AT ..... 20.
Innovative Concepts
* Flip n' File 50 *(holds 50 disks)* ..... 16.
* Flip Sort *(holds 70 disks)* ..... 15.
PC Connection
* Computer Toolkit *(all the tools you need to go with your PC in a software style binder)* ..... 29.

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- We accept VISA and MASTERCARD.
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- UPS Next-Day-Air available.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products.*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

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Note: Accounts on net terms pay actual shipping.
Continental US:
- For monitors, printers, and drives, add 2% for UPS ground. Call for UPS 2nd-Day & Next-Day-Air.
- For computers, pay actual charges. Call for UPS 2nd-Day & Next-Day-Air.
- For all other items, add $2 per order to cover UPS Shipping. For such items, we automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground.

Hawaii:
- For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add $2 per order.

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- Call 603/446-3383 for information.

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TRAINING

ATI ... CP
SKILL BUILDER PROGRAMS
PC-DOS MS-DOS BASIC
IBM-PC DOS-Reference *(NCP)* . . *each* $33.
TRAINING POWER PROGRAMS
Lotus 1-2-3 Wordperfect dBase III Plus
WordStar Displaywrite 3 . . . . *each* 43.
Individual Software ... CP
The Instructor II . . . . . 26.
Professor DOS. . . . . 33.
Tutorial Set *(both items above)* . . . . . 49.
Typing Instructor II . . . . . 26.
Training for Lotus 1-2-3 *(for vers. 1A & 2)*. . . 37.
Training for Accounting . . . . . 37.
Microsoft ... NCP
Learning DOS *(for any version)* . . . . . 33.
Simon & Schuster ... NCP
Typing Tutor III 1.5 . . . . . 33.

EDUCATIONAL

All educational programs listed are copy-protected except where noted.

Barron's
Computer SAT . . . . . 35.
Designware *(reqs. CGA)*
Spellicopter *(ages 6 to adult)* . . . . . 22.
Eduware *(reqs. CGA)*
Algebra 1,2,3, or 4 . . . . . 22.
Stone & Associates *(reqs. CGA)*
My Letters,Numbers,Words *(ages 1 to 5)* . . 27.
Kids Stuff *(ages 3 to 8)* . . . . . 27.
True BASIC, Inc. ... NCP
Calculus . . . . . 32.
PreCalculus. . . . . 32.
Trigonometry . . . . . 32.

RECREATIONAL

All recreational programs listed are copy-protected except where noted.

Blue Chip
Managing for Success *(American Dream)* . 36.
Millionaire . . . . . 36.
Electronic Arts ... NCP
Starflight *(reqs. CGA)*. . . . . 32.
Hayden Software
Sargon III *(highest rated Chess program)*. . 32.
Infocom ... NCP
Enchanter the Witness Planetfall
Leather Goddesses Hitchhiker's Guide
Moonmist Zork I . . . . . *each* 24.
Zork II Zork III . . . . . *each* 27.
Invisiclues (hint booklets). Specify game . . . 6.
Microleague Sports *(reqs. CGA)*
Microleague Baseball . . . . . 25.
Microprose *(reqs. CGA)*
F-15 Srike Eagle. . . . . 22.
Silent Service. . . . . 22.

PC Connection Hardware Special
through March 31, 1987

KRAFT
✓**Micromouse**

Finally, an inexpensive alternative for those of you who always wanted to get a mouse, but couldn't swallow paying so much for it. The Kraft Micromouse comes with its own driver software, and it also works with the Microsoft Mouse driver. Just think, you can mouse your way across the world now for less than $70!

- Three-button opto-mechanical operation, plugs directly into 25-pin serial port
- Includes driver software as well as Menu-Pops (create your own menus)
- Easy-to-remove, easy-to-clean rubber ball, five-foot mouse cable. Power supply included.

For the IBM-PC, XT, & AT . . . . . $61.
(IBM PC, XT, or AT with 9-pin serial port requires additional cable, $19.)

Microsoft *(reqs. graphics brd.)*
★✓Flight Simulator 2.12 . . . . . 32.
Mindscape *(reqs. graphics brd.)*
✓Balance of Power *(avoid nuclear war)*. . . . . 30.
1Step Software *(reqs. CGA)*
★✓Golf's Best *(Pinehurst or St. Andrew's)* . . . . 19.
Parlor Software
★✓Bridge Parlor *(best Bridge simulation)* . . . . 49.
Sierra On-Line *(reqs. CGA)*
★✓Space Quest . . . . . 32.
★✓King's Quest II. . . . . 33.
★✓King's Quest III . . . . . 33.
Simon & Schuster
★✓Star Trek/Kobayashi. . . . . 27.
Spectrum Holobyte *(reqs. CGA)*
★✓Orbiter *(Shuttle simulation)*. . . . . 27.
★✓GATO . . . . . 27.
Sublogic *(reqs. graphics brd.)*
★✓Jet. . . . . 33.
XOR ... NCP
★✓NFL Challenge *(be the coach)*. . . . . 79.

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HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

AST Research ... 2 years
All boards listed (except Piggyback) include a FREE copy of DESQView.
SixPakPlus 64k C/S/P . . . . . $169.
SixPakPlus 384k C/S/P *(fully populated)* . . . 209.
SixPakPremium 256k C/S/P
(upgrades to 1 Mb or 2 Mb w/Piggyback) . . . call
SixPakPremium Piggyback Board 256k . . 189.
✓Advantage Premium 512k S/P
(upgrades to 1 Mb or 2 Mb w/Piggyback) . . . call
✓Advantage Premium Piggyback 512k . . . . 289.
RAMpage! 256k *(upgrades to 2Mb)* . . . . . call
✓RAMpage! AT 512k *(upgrades to 2Mb)* . . . 449.
✓RAMpage EGA 512k *(for the IBM-AT)* . . . . . 699.
AST Premium series boards and RAMpage! boards support EMS and fully support EEMS.
Amdek ... 2 years
✓Video 310A mono monitor *(amber)*. . . . . 159.
✓Color 722 - EGA compatible . . . . . 499.
Compucable ... lifetime
✓Smartmodem-to-AT cable *(9 feet)*. . . . . 19.
✓15-foot Parallel Printer cable . . . . . 27.
✓2-Position *(AB switch box)* . . . . . 39.
✓3-Position *(ABC switch box)*. . . . . 65.
Cuesta ... 1 year
✓Datasaver 400 Watt *(backup power unit)*. . . 499.
Curtis ... lifetime
ACCESSORIES
✓Printer Stand . . . . . 18.
★✓Universal System Stand . . . . . 25.
CABLES
Smartmodem-to-PC Cable *(9 feet)* . . . . . 17.
✓Keyboard Extension Cable *(3 to 9 feet)*. . . . . 27.
✓Extension Cables for IBM Mono Display . . . 33.
✓Printer-to-IBM cable *(9 feet)* . . . . . 17.
SURGE SUPPRESSORS
★✓Safestrip *(6 outlets)* . . . . . 21.
★✓Diamond *(6 outlets)*. . . . . 29.
★✓Diamond-Plus *(w/FAX & modem protection)* 41.
★✓Emerald *(6 outlets; 6 ft cord)* . . . . . 36.
★✓Sapphire *(3 outlets; EMI/RFI filtered)* . . . . . 47.
★✓Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* . . . 55.
★✓Ruby-Plus *(w/FAX & modem protection)* . . . . 65.
★✓Command Center . . . . . .SPECIAL . . . . . 79.
DCA ... 1 year
✓Irma *(3270 emulation board)* . . . . . 729.
Epson ... 1 year
✓EX-800 printer *(80 col., 300 cps)* . . . . . 499.
✓EX-1000 printer *(136 col., 300 cps)*. . . . . 599.
✓*NEW* FX-286e *(136 col., 200 cps)*. . . . . 539.
✓*NEW* FX-86e printer *(80 col., 200 cps)* . . . . 399.
✓LX-86 printer *(80 col., 120 cps)*. . . . . 249.
✓LQ-800 printer *(80 col., 180 cps)* . . . . . 549.
✓LQ-1000 printer *(136 col., 180 cps)* . . . . . 759.
✓LQ-2500 printer*(136 col., 324 cps)* . . . . . 1089.
✓*Printer-to-IBM cable (6 feet)*. . . . . 15.

For the IBM-PC (XT & AT) *Exclusively*.

PC CONNECTION®

Ventura: Complete Desktop Publishing

In a world where piecemeal desktop publishing solutions are the norm, Ventura Publisher Edition is a shining exception. The program lets you handle text-laden tomes and picture-studded newsletters with equal aplomb, and it sports an interface that even a Macintosh user could love. Could this be the 1-2-3 of PC publishing programs?

Ted Nace

As someone with more than a passing interest in using the PC as a publishing tool, I admit that the last few years have been a trial. While I and thousands of other PC citizens struggled with comparatively simple tasks—like merging a *1-2-3* chart into a memo—chortling Macintosh users were cranking out newsletters, brochures, and even magazines by the bushel. As the chorus of I-told-you-so's rose, PC users hoped against hope for a super publishing program that would, in a single bound, vault them beyond the Mac. Or at least let them catch up.

Well, it looks like Clark Kent has finally found his phone booth. Not only does *Ventura Publisher Edition* from Xerox Corporation easily match the prowess of any Mac software, it's also one of those rare programs that demolishes conventional wisdom about what is and isn't possible on the PC.

Shattered Myths

Both pundits and desktop publishing vendors (among them the makers of *PageMaker*) contend that the new breed of what-you-see, graphics-oriented publishing programs mandate an AT. Suprise! Although *Ventura* practically zooms on an AT, it performs credibly on a Hercules-equipped 512K PC with a 10MB hard disk—and fairly skips along on a 640K Deskpro with a 20MB hard disk (see Figure 1). If you can't bear (or afford) to part with your 8088- or 8086-based machine for the sake of desktop publishing, you can now save your coins for a JLaser board, a scanner, or better still—a full-page display.

Richard McNeel

Another dire prediction—that the multiplicity of data formats and hardware devices will cause more snarls than a capsized 18-wheeler during rush hour—can also be laid to rest. *Ventura* accommodates most major word processors, graphics from programs such as *1-2-3* and *PC Paintbrush,* several popular scanners, and numerous laser printers—plus Epson dot matrix printers and PostScript typesetters. Not bad for release 1.00.

Of course, the experts also proclaim that no single publishing program can adroitly manipulate both long, standardized documents and layout-intensive forms, brochures, and newsletters. It is true that *Ventura*'s forte is technical manuals, business reports, books, and other weighty tracts. In some ways, the program is like a super *Microsoft Word,* complete with powerful style sheets; automatic chapter, page, subhead, caption, and footnote numbering; automatic table-of-contents and index generation; easy text and image integration; plus the ability to import any number of word processor files without flinching.

Don't write off *Ventura* when it comes to shorter jobs either. Although the PC version of *PageMaker* is modeled on the graphic artist's pasteup table and is thus well suited for complex layouts, *Ventura* can whip out an invoice or order form just as easily as it can a 600-page manual. Such switch-hitting, along with *Ventura*'s comprehensible design, may win the program converts throughout corporate America.

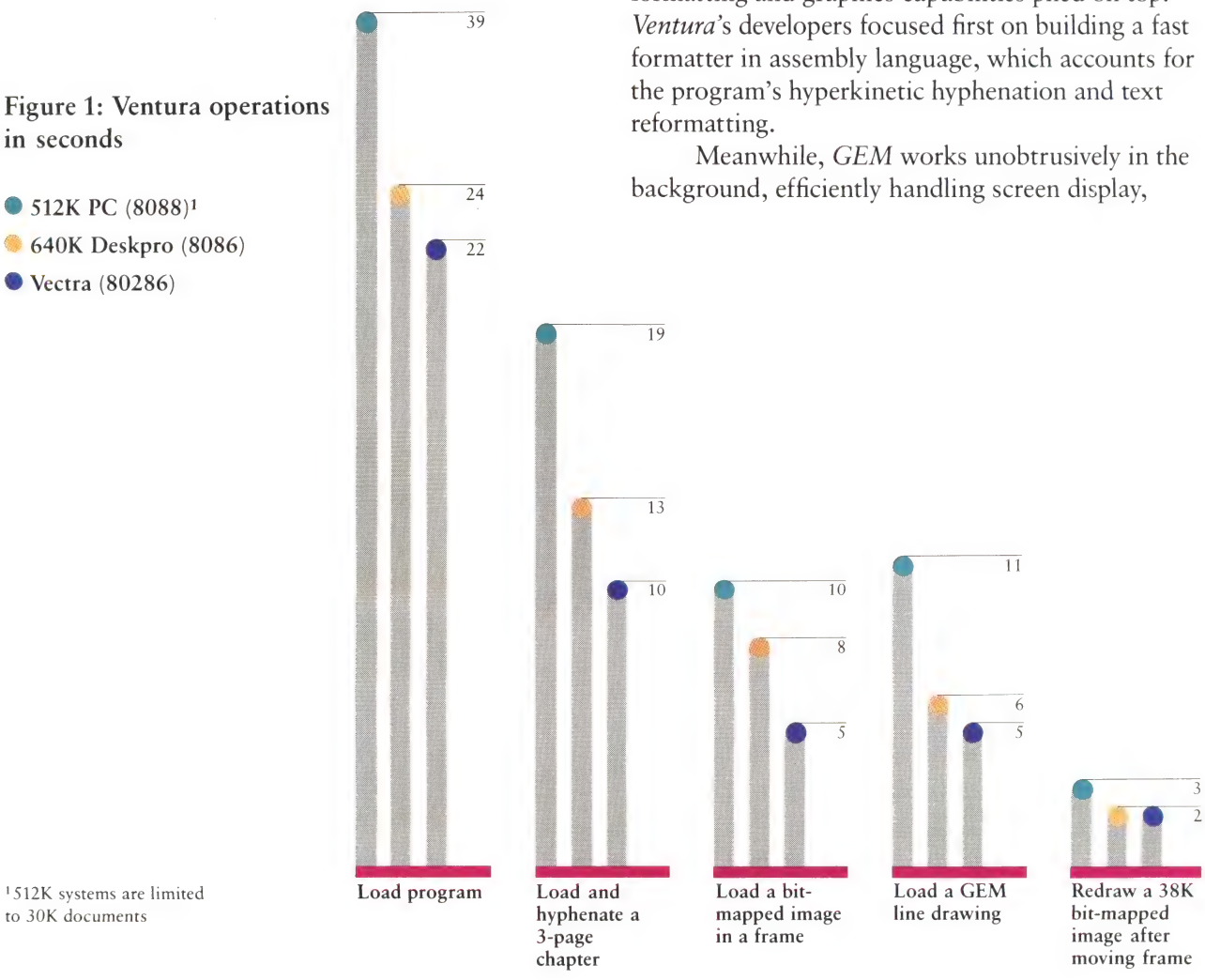
Behind the Magic

Ventura doesn't hail from Krypton. The keys to the program's remarkable versatility and speed are found in its from-the-ground-up design and reliance on *GEM,* Digital Research's scaled-down answer to *Microsoft Windows.*

At the core of most desktop publishing programs is a glorified word processor with enhanced formatting and graphics capabilities piled on top. *Ventura*'s developers focused first on building a fast formatter in assembly language, which accounts for the program's hyperkinetic hyphenation and text reformatting.

Meanwhile, *GEM* works unobtrusively in the background, efficiently handling screen display,

Figure 1: Ventura operations in seconds

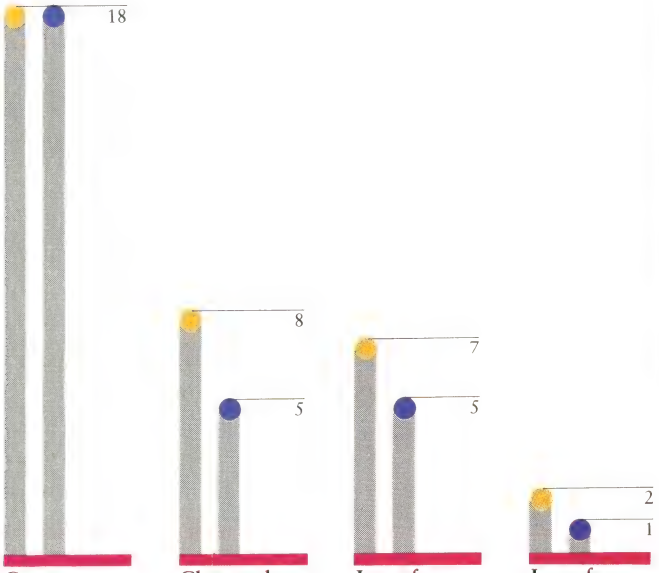


[1] 512K systems are limited to 30K documents

providing printer drivers, and attending to other mundane chores. Since *GEM* is a graphics interface rather than an ambitious multitasking operating environment like *Windows,* it makes fewer demands on the computer's microprocessor. You don't open windows, dynamically pass data between applications, or use a clipboard to tote graphics to and fro. With *Ventura* you just clear out a space, import text and graphics created with other programs, and go to work. That's why you don't need an AT to run *Ventura*—and why you will need one to run *PageMaker* and other publishing programs designed to work with *Windows.*

Credit is also due *Ventura*'s canny file manipulation. Instead of merging text and graphics files into a formatted whole, *Ventura* maintains a small master file containing formatting information and pointers to the various files that make up the document. Thus, when you cut a bar chart out of page 1 and paste it onto page 50, *Ventura* merely rearranges the necessary pointers in the master file instead of lugging the actual data around. If you have to print a *Ventura*-set document on another system, the program will gather together all the relevant files (a chapter, in *Ventura* parlance) and place them in a subdirectory or on a floppy disk.

Although original graphics and scanned image files are not altered, *Ventura* manipulates and alters word-processed document files. This approach not only conserves disk space but makes last-minute revisions a breeze because the original files reflect any changes made with *Ventura.*



Convert, import, and hyphenate a 115K Microsoft Word document

Change the number of columns and rehyphenate a 25-page (111K) document

Jump from the first to the last page of a 25-page document

Jump from the last to the first page of a 25-page document

Direct to Disk

It's clear as soon as you open the box that *Ventura* means business. The package spans 11 disks holding program files, fonts, and printer drivers. Depending on the type and number of printers installed (as many as five are permitted), setup can top 30 minutes and consume as little as 1MB (for the HP LaserJet or PostScript printers) or as much as 3MB (for the LaserJet Plus, Xerox 4045, the JLaser board, or other devices using downloadable bit-mapped fonts). Unlike most PC publishing programs, *Ventura* provides its own set of Times Roman, Helvetica, and Courier fonts plus a symbol font. Other downloadable disk fonts (including HP's soft fonts) can be tapped once you run them through *Ventura*'s conversion utility.

Installation is generally a foolproof, follow-the-prompts affair. But if you change any element later, you must reinstall the entire program—a step Xerox pledges to eliminate in future releases.

Executive Summary

Ventura Publisher Edition

Desktop publishing program

Ventura Publisher is designed to produce long, standardized documents—manuals, reports, and books—although it ably handles shorter, layout-intensive applications such as forms and newsletters. Capturing, sizing, and integrating graphics produced by other programs is remarkably simple, as is changing documentwide formatting. Multiple formats and printers are supported, but the program lacks some professional typographic functions.

Text/graphics integration	*Excellent*
Pagination and layout controls	*Excellent*
Typographic features	*Good*
Text processing	*Good*
Graphics generation	*Good*
Overall value	*Excellent*

A Familiar Face

If you've ever used a Macintosh, *Ventura* will induce déjà vu. The screen is dominated by a large work area; above are pulldown menus, and to the left are four mode icons, a large panel called the Assignment List that catalogs available options, and miscellaneous status indicators (see Figure 2). Like Mac and *Windows* applications, the cursor pointer changes shape (to a cross hair, angle bracket, and so on) as different modes are triggered. You can issue some commands from the keyboard, but for all practical purposes, you run the show with a mouse.

Most users will probably take to *Ventura*'s point-and-click method of picking commands, but moving around a document with a mouse takes some readjustment. The cursor keys work only in text mode, although <PgUp> and <PgDn> work in all modes. Scrolling a page up, down, right, or left means moving the pointer to a scroll bar and clicking.

Working on a document also means getting used to the concept of views. You can contemplate two facing pages or a single page (both are typically employed to get the big picture during layout); a normal view (which shows a life-size portion of a document for text editing); or an enlarged, twice normal view (for kerning text and other detail work). Keep in mind that the better the video configuration, the easier the program. On a CGA system, text can be read only in normal and enlarged views; with a Hercules Graphics Card or EGA setup, you can select single-page view and still read the text. However, if you spend a lot of time with *Ventura,* you'll wind up craving a high-resolution, full-page monitor.

Framing Documents

Ventura uses four modes to group related functions—Frame Setting, Paragraph Tagging, Text Editing, and Graphics Drawing. Modes are *Ventura*'s way of logically grouping related functions. If you need to corral imported text or graphics, you click the Frame Setting icon and pop open all-purpose containers called frames. To edit captured text with *Ventura*'s built-in word processor, you select the Text Editing mode. Actually formatting the text—specifying fonts, leading, and other attributes—is done in Paragraph Tagging mode, while enhancing a page with boxes, lines, arrows, and circles is accomplished with drawing tools made available in the Graphics Drawing mode.

Basic document layout is accomplished in the Frame mode. Although all page frames are designed to hold (and isolate) text and graphics, the first page frame is the most important, for it defines the look of the entire document. (In contrast *PageMaker* treats every page as a discrete entity that must be formatted separately.) Since anything defined in this underlying frame is reflected in all subsquent pages, creating standardized documents is a snap.

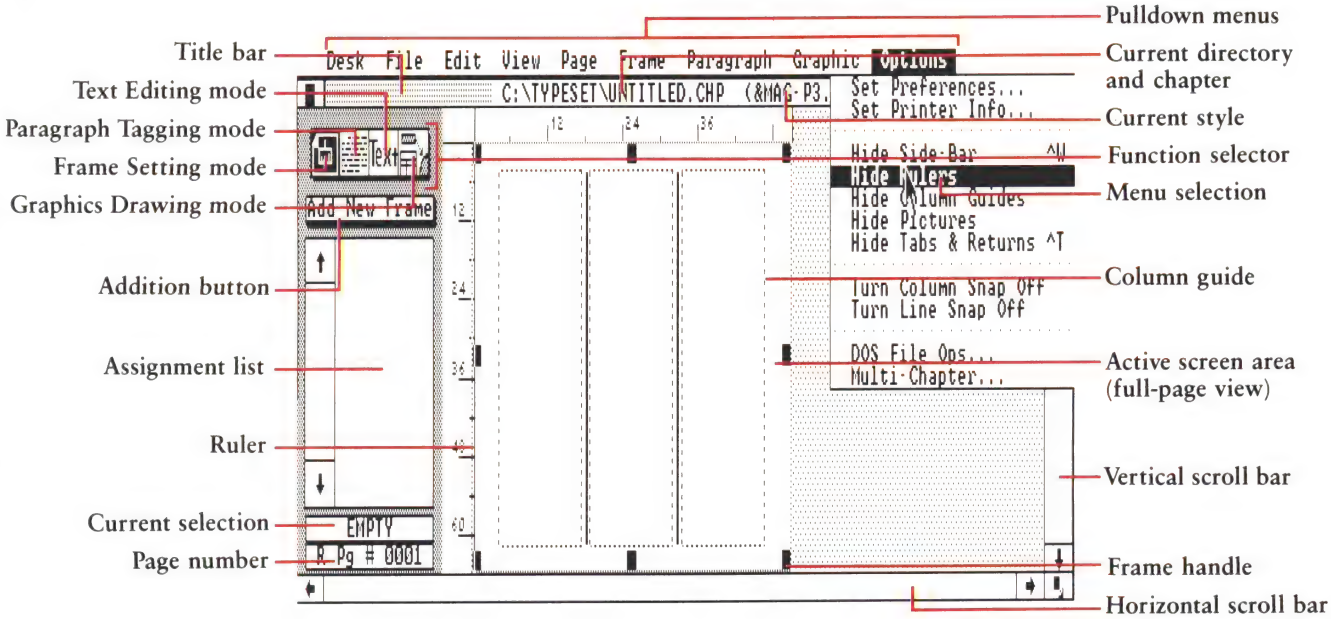
If you spend a lot of time with Ventura, *you'll wind up craving a high-resolution, full-page monitor.*

In general, you specify columns, margins, rules, and other documentwide formatting on this underlying frame and confine illustrative graphics, headlines, scanned images, and so on to their own subsidiary frames. Don't drop a graphic directly onto the first page frame unless you want it to appear in the same position throughout the document. However, you will probably want to pour the body of a document onto the page frame so that text will automatically flow onto subsequent pages and snake around other frames.

Creating a frame is simple work. To place a graphic on a page, you would first click the Frame icon, position the pointer where the top left corner of the frame would begin, then drag the mouse down and right to stretch out the dimensions of the frame. Select the 'Load Text/Graphics' command from the Frame menu, specify the file type (such as *GEM,* or *Paintbrush*) in the on-screen form *Ventura* provides, supply the name of the graphics file (such as LOTUS.PIC), and voilà—the picture pops into the frame. The process for importing a text file is identical. You can move the frame around with the mouse, copy its contents, and resize the image it contains.

Once you've dragged a frame to the desired spot, you can precisely position it by entering specific

Figure 2: Ventura Publisher's opening screen, showing pulldown menus along the top and four mode icons near the top left. The assignment list panel notes available tags (in Paragraph Tagging mode), active text and graphics files (in Frame Setting mode), or character attributes (in Text Editing mode).



coordinates at the Frame menu and then add borders, shading, and more. This alternation of slapping a frame in place with the mouse and using menus to make fine adjustments is a recurrent theme in *Ventura*'s design. Naturally, any time you add, move, or size a frame, *Ventura* automatically hyphenates and reforms the text around the frame (see Screen 1).

In theory, using frames is simple enough, but until you become accustomed to them you may wish for simpler times. If you forget to activate the Frame mode before trying to drag a frame around, you will click madly away and fail to budge the objects of your desire. Once you click the Frame icon, however, *Ventura* identifies the active frame by surrounding it with small black rectangles.

We're All in This Together

As noted earlier, incorporating text and graphics in a *Ventura* document is simplicity itself. You merely identify the text and graphics files, fill out a short immigration form, and welcome the newcomers to their respective frames. Most immigrants fit right in, but not all of them are tractable at first.

Although *Ventura* easily converts ASCII and major word processing files, only character attributes such as boldface, underlining, and italics are carried over from the original document. Line spacing and your agonizingly precise *Word* style sheets are discarded like so much chaff; your file arrives single-spaced, minus embellishments. Tabs, however, make the trip, but none too well. If the settings in the original document don't match *Ventura*'s, imported text may be scattered about a frame.

To avoid headaches, minimize formatting in your original documents. Don't fuss with style sheets, mixed spacing, or tabs. Create documents flush left and ragged right with a few carriage returns to separate paragraphs. Let *Ventura*'s style sheets do the rest. The best way to format complex elements, such as tables, is to use *Ventura*'s native word processor or the Box Text feature.

Capturing and sizing pictures is one of the easiest tasks in *Ventura*, but keep in mind that not all pictures are manipulated equally. When you first import

a bit-mapped picture, such as a graphic generated with *PC Paintbrush* or an image digitized with a scanner, usually only a portion is visible in the frame. You can size the image to fit the frame, crop the picture, or change the size of the frame. Object graphics generated by *1-2-3, AutoCAD, GEM Draw, Mentor Graphics,* and compatible programs are less malleable. They can't be cropped, but you can stretch and shrink them to fit, with the option of preserving relative horizontal and vertical dimensions.

Dressing Up Type

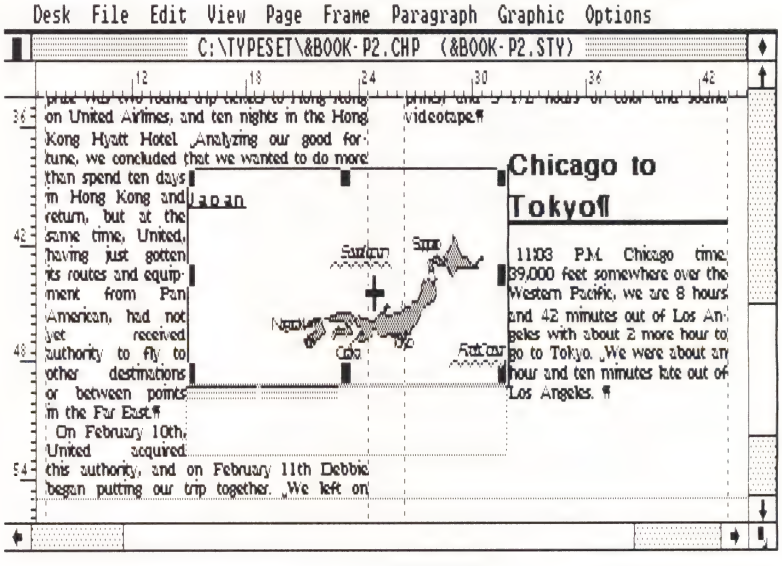
Text enters the *Ventura* environment unadorned, save for simple character attributes. To add the desired typographic information—font, type size, leading (line spacing), centering, justification, and so on—you turn to *Ventura*'s Paragraph Tagging mode.

If you've mastered *Word*'s style sheet formatting, you'll feel right at home. A *Ventura* style sheet is a collection of formats (or tags) for every paragraph in a document, from body text to chapter title. A document is restricted to one style sheet at a time, but several documents or chapters using different styles can be chained together and numbered sequentially.

Load a style sheet from the File menu, and the Assignment List panel on the left of the screen lists the available tags by name. To actually impose a format, highlight the text in question with the mouse and click the tag name. If you pick the subhead tag, for example, *Ventura* will format the selected text according to the tag's predefined attributes.

For more speedy and convenient formatting, *Ventura* provides two alternative methods. One lets you assign tag names to function keys; the other lets you place formatting information in the original text file. To do this you use your word processor to insert an @ followed by the name of the tag at the beginning of each paragraph. The latter method will be welcomed by documentation work groups keen on involving technical writers in the formatting task.

Forging a style sheet from scratch is not a major enterprise, but it's far simpler and faster to modify one of the 20 style sheets supplied with the program. For example, to create your own book style, you set up the page frame's margins and columns, import your opus, select *Ventura*'s single-column book style, and then format the elements in the book using the appropriate tags. To alter the subhead tag, you merely highlight a subheading, pull down the Paragraph menu, and change the font, indentation, and other values. Other subheads so tagged automatically assume the new format; text subsequently branded as a



Screen 1: To move a frame to a new location, simply place the pointer on the frame, hold the mouse button down, and drag the frame away. Notice how Ventura has reformatted the page.

subhead will also reflect the change. Save the altered style sheet with a different file name, and you have a new style sheet that you can recall later.

One glaring omission: You can't print out or display all the settings in a style sheet. To create a printed version of a style sheet, you would have to load the sheet, select tags one at time, plow through the menus one by one, and note the formatting linked to each tag. Given *Ventura*'s expected adoption by corporate publishing departments—and the fact that most such departments maintain style sheets for quick reference and archival purposes—Xerox would do well to correct this oversight in the first revision of the product.

Other Ways and Modes

Lesser *Ventura* lights include its Text Editing and Graphics Drawing modes, which respectively enable you to quickly revise a shaky paragraph and enhance a figure without resorting to outside programs (see Screen 2).

As you might expect, *Ventura*'s built-in text editor is tailored to entering short passages and correcting imported text. *Ventura* will automatically wrap text within margins and columns, and you can delete characters or blocks, cut and paste text, and even add boldface, italics, underlining, and other attributes. But it lacks useful features such as search and replace.

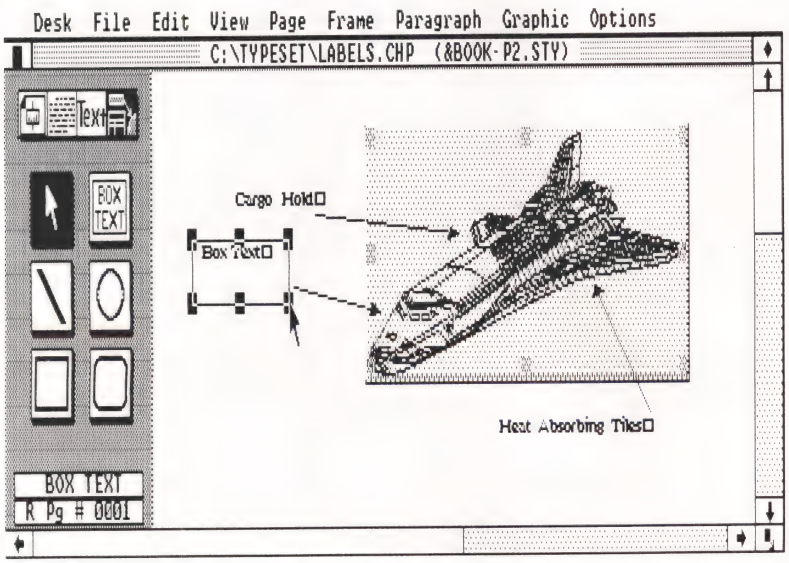
Click *Ventura*'s Graphics Drawing icon, and before you lies a simple drawing program that can fashion lines, boxes, circles, and special text-holding boxes; the assignment panel displays the appropriate icons of the trade. From the Graphics menu, you choose line thickness, patterns, and other functions. Drawn figures can overlap and be moved as a group.

If your hands are shaking with excitement, flicking on the Snap-To option lays an invisible grid on the screen, which helps you position graphics precisely. You can scale the grid in inches, centimeters, and picas and points to within one thousandth of an inch. On calmer days, you can turn Snap-To off and paste graphics anywhere on the page.

Don't overlook the Box Text command. I found myself using this feature more than any other to quickly create tables and forms (see Figure 3). When you draw a box with this function, *Ventura* places the words 'Box Text' in the figure. You replace these words with your own centered, right-, or left-justified text.

A Typographic Mixed Bag

Ventura doesn't offer as many typographic controls as a pricey commercial typesetting system like *MagnaType*, but it packs enough professional features to satisfy serious users. Those steeped in traditional typesetting, however, may chafe at the limits.



Screen 2: With the Box Text command and Ventura's drawing functions, you can quickly label a piece of line art. When the frame holding the image is moved, the arrows and labels go with it.

Ventura's hyphenation routine sacrifices completeness for speed. Instead of splitting words in accordance with a hyphenation dictionary in the manner of big-time typesetters, *Ventura* relies on a set of rules embodied in an algorithm. Xerox isn't lying when it claims *Ventura* can hyphenate a massive document in seconds. What the company won't tell you is that many hyphenation opportunites are ignored. While doing nothing beats breaking a word incorrectly, you can't force *Ventura* to automatically hyphenate a word. Consequently, when setting type in narrow margins, you will frequently find yourself manually inserting hyphens.

Although automatic kerning is absent, *Ventura* deserves kudos for including an easy-to-use manual routine. You simply activate Text mode, highlight a character, select the Set Font option, and specify on the Font Setting form how far (in inches, centimeters, or points) the character should be shifted to the left; text to the right is reformatted automatically.

Unfortunately, this is where the what-you-see-is-what-you-get philosophy breaks down. At this level of detail, *Ventura* can't compensate for the differences between monitor and printer resolution. As a result, text that appears nicely kerned on screen may become crowded (and sometimes overlapped) on the page.

Many other desired typographic controls are missing or limited (see Table 1). Leading can be varied only between paragraphs, and tracking control is not available. For controlling spacebands—adjusting spaces between words to justify a line—*Ventura* offers only optimum and minimum widths.

However, the ingenious publisher can achieve some effects with digital duct tape. You can change leading for an individual character or a group of characters by using the Shift command from the Font Setting menu. A thin empty frame can also be inserted between paragraphs to simulate extra leading. Keep in mind that most of these patches are temporary at best, since these frames will stay in the same place when text is reformatted.

Powerhouse Pagination

Despite its occasional typographic shortcomings, *Ventura* deserves cordial applause, especially considering the generally dismal talents of most desktop publishing programs. But *Ventura*'s prowess in pagination—the process of automatically laying out a document—rates a standing ovation.

The key, of course, is the master or underlying page frame, which enables the program to extend a format throughout a document. When you fill this frame with text, *Ventura* automatically creates the number of pages needed to accommodate the text, wrapping and reforming around subsidiary frames holding pictures and text. The page frame can contain as many as eight columns of equal or unequal width separated by vertical rules. You can paste up pages in either portrait (upright) or landscape (sideways) orientation and set up distinct layouts for left and right pages.

Better still, while most desktop publishing programs balk at documents longer than 12 or 16 pages, *Ventura* excels at handling veritable tomes. Chapters can run to 100 pages, and *Ventura* can pull together as many as 64 chapters into a sequentially numbered megadocument. Automatic numbering applies to virtually anything you might think of: pages, captions,

INVOICE

To:		Invoice Number
		Invoice Date
		Purchase Order Number
Quantity	Item	Amount
	Total Due	
Notes:		

Figure 3: Creating an elegant and utilitarian invoice takes minutes using the Box Text command.

Table 1: Ventura typographic and document control features

Typographic features

Automatic hyphenation	●
Manual hyphenation	●
Measured hyphenation and justification mode	
User-expandable exception dictionary	●
Manual kerning	●
Automatic kerning	
Tracking control	
Spaceband control	●[1]
Letterspacing control	
Multiple fonts	●
Fraction building	
Table building	●[2]
Horizontal rules	●
Vertical rules	●
Automatic bullets	●
Drop caps	●
Tabs per paragraph	16
Tab alignment	
left	●
right	●
center	●
decimal	●
Leader tab characters	●
Measurement units	
inches	●
centimeters	●
picas	●
points	●
fractional points	●
Quad commands	
First line indents	●
Right indents	●
Hanging indents	●
Counting indents	
Skewed indents	
Spot indents	
Fixed spaces	

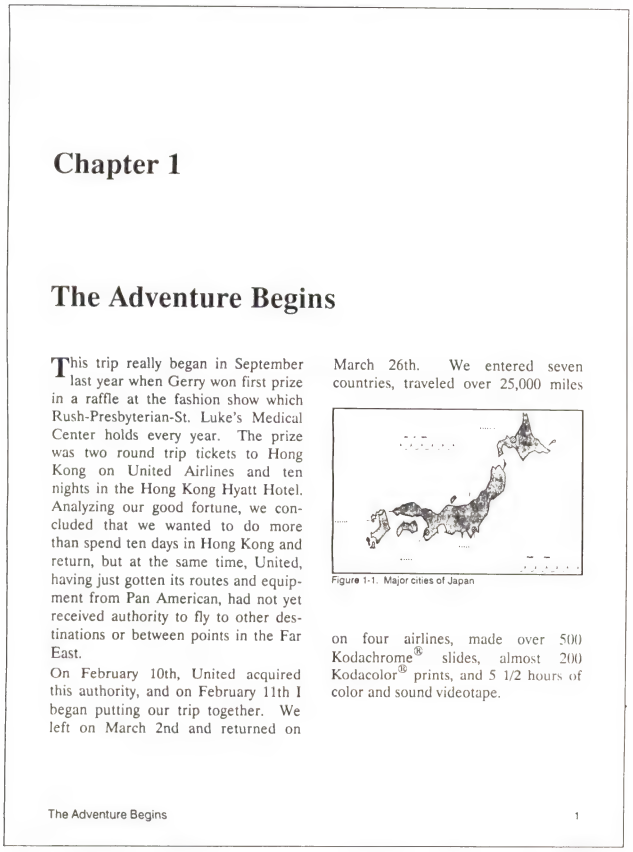
Document and page controls

Automatic text flow across pages	●
Separate left and right page formats	●
Automatic page and section numbering	●
Adjustable widow and orphan control	●
Column balancing on last page	●
Automatic table-of-contents generation	●
Automatic index generation	●
Automatic footnotes	●
Graphics anchored to text	
Captions anchored to graphics	●
Labels and arrows anchored to graphics	●
Maximum header and footer length (lines)	2
Left-justified, centered, and right-justified headers and footers	●
Levels of section numbering	8
Multiple numbering styles	●

[1]Optimum and minimum widths only
[2]Using Box Text command

footnotes, and up to eight levels of subheads. Nettlesome, however, is *Ventura*'s inability to anchor graphics to specific sections of text. The frames that hold graphics are placed at fixed locations. When a document is heavily revised and reformatted, the surrounding text may flow away, forcing you to reposition the frames.

Still, even *Ventura*'s miscellaneous controls are impressive. Captions never stray from their appointed pictures, and headers and footers can include centered and left- and right-justified text on the same line—handy for putting a chapter name and a page number on opposite sides of a line. *Ventura* also offers column balancing, which evens out the length of columns on the final page of a multicolumn document. In *Word*-like fashion, the program will also automatically prepare a table of contents and a document index if you mark the appropriate entries in the text.



Chapter 1

The Adventure Begins

This trip really began in September last year when Gerry won first prize in a raffle at the fashion show which Rush-Presbyterian-St. Luke's Medical Center holds every year. The prize was two round trip tickets to Hong Kong on United Airlines and ten nights in the Hong Kong Hyatt Hotel. Analyzing our good fortune, we concluded that we wanted to do more than spend ten days in Hong Kong and return, but at the same time, United, having just gotten its routes and equipment from Pan American, had not yet received authority to fly to other destinations or between points in the Far East.

On February 10th, United acquired this authority, and on February 11th I began putting our trip together. We left on March 2nd and returned on March 26th. We entered seven countries, traveled over 25,000 miles on four airlines, made over 500 Kodachrome® slides, almost 200 Kodacolor® prints, and 5 1/2 hours of color and sound videotape.

Figure 1-1. Major cities of Japan

The Adventure Begins 1

Figure 4: The adventure begins with a single program. Incorporating all the elements you need in a document—different type sizes, drop caps, graphics, dual columns, footers, and page numbers—takes but minutes.

Final Output

The success of any desktop publishing program ultimately hinges on its skill at coaxing sharp output from a laser printer (see Figure 4). *Ventura* supports virtually any laser printer for the PC, plus higher-resolution PostScript devices such as the 400-dpi Agfa-Gevaert laser printer and Allied Linotype's 1200-dpi Linotronic 100PS and 2450-dpi 300PS phototypesetters. The AST TurboLaser and the Xerox 4045 are supported. Such expansiveness, however, entails a few compromises along the way.

Ventura's designers couldn't ignore the huge base of LaserJet users, but the program's capabilities here serve mainly to highlight the shortcomings of a laser printer with a mere 59K of memory. Graphics are limited to a crude 75 dpi, and 300-dpi text output is confined to HP's 92286F font cartridge. With the more capacious LaserJet Plus or a comparable printer, of course, a 300-dpi graphic can cover nearly 40 percent of a page, and all of *Ventura*'s downloadable fonts are available.

The driver provided for the Tall Tree JLaser Plus board will swell the ranks of *Ventura* fans, since it allows the program to be used with any of the host of laser printers using the Canon engine, including the QMS KISS, Corona LP-300, and HP LaserJet family. A utility provided by Tall Tree allows any fonts in LaserJet format to be converted for use with JLaser.

Unfortunately, like most of its Macintosh peers, *Ventura* can tap only a fraction of PostScript's dazzling powers. There's no way to stretch and rotate text, much less generate fonts of virtually any size. But you do have access to type sizes as large as 72 points and the option of proofing a document on a LaserWriter or other PostScript printer before using an expensive phototypesetter.

Whatever the printer, keep in mind that only fonts supplied with *Ventura* can be used immediately. Downloadable fonts from Hewlett-Packard, Adobe, VS Software, and other vendors must be converted with a supplied utility that creates the necessary font-width tables *Ventura* uses when determining line breaks. This greatly expands the number of fonts you can use with the program, but the process is not for newcomers, and naturally, the more fonts you convert, the more disk space you consume. Although

Ventura lists converted fonts as menu options, it will not display them on screen, instead representing them with its own Roman and Helvetica fonts.

A highly useful feature of *Ventura*'s printer drivers is that the program lets you use font-width tables from one printer while you print on another. Thus, you might proof line breaks using an inexpensive QMS KISS and then produce actual masters on a PostScript phototypesetter.

Note, too, that whenever you print a document, *Ventura* automatically downloads the required fonts. While perhaps convenient for the technophobic (and those using *Ventura* on a network), this is a time-consuming experience, since you typically print a document several times before it suits you. If Xerox wants to sew up this market, the next release of the program should allow you to turn this option off.

A Ventura Wish List

For a premiere product, *Ventura* is simply remarkable. The program offers nearly every feature desired by desktop publishers, supports a gaggle of hardware devices and file formats, is relatively easy to use and reasonably bug-free, and by all measures is a reformatting and printing speed demon (see Figure 5). But there's always room for improvement.

Ventura's multiple mode approach cries out for some context-sensitive on-line help and perhaps an on-line tutorial. Considering the complexity of pasting up a page (and the fact that even an experienced user can get snarled up in frames), an undo command is also essential. The text editor could use some more traditional word processing functions, such as search and replace, but I'd opt first for a data base merge function to take advantage of *Ventura*'s superb forms generation capabilities. Hyphenation and kerning features need work, and designers should expect future versions to include extended ruler guides for positioning frames.

Even if Xerox takes its time fine-tuning the package, *Ventura* seems assured a long and successful life in the desktop publishing marketplace—at least by contemporary software standards. Although the PC version of *PageMaker* is still a question mark, it seems likely that *Ventura* will dominate in corporate publishing departments, with their use of massive standardized documents, and will undoubtedly find favor with smaller publishers of every stripe who are tired of patchwork solutions. *Ventura* may not be the alpha and omega of desktop publishing programs, but it elegantly solves a spate of problems without punishing the user in the process. And that's a big step in the right direction.

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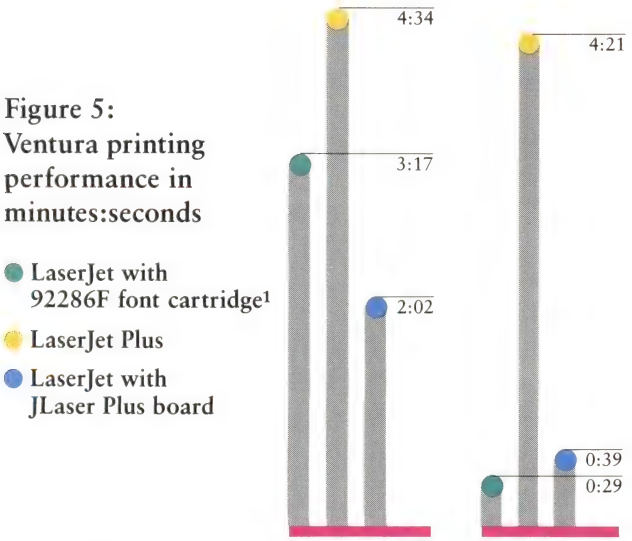
Figure 5: Ventura printing performance in minutes:seconds



[1] Can't reproduce all fonts, so system makes closest possible match to fonts in cartridge

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101 Continental Blvd.
El Segundo, CA 90245
800/822-8221
List price: $895
Requirements: 512K (640K recommended); hard disk; DOS 2.10 or later version; Microsoft bus mouse or serial mouse, Mouse Systems PC Mouse, or Xerox 6065 mouse; monochrome or color graphics board
Not copy protected

Backing Up Is Hard to Do

Backing up a hard disk onto floppies is tedious at best. But even the maladroit among us might take up floppy-juggling if we could avoid paying the $1000 price of a tape backup unit. One of these inexpensive utilities can help you speed your backups and manage archived data.

Art Wilcox

Although hard disk prices have plummeted over the past few years, the cost of tape backup units has not. These life-saving devices hover around $1000—twice the price of most hard disks and about the same as a low-end PC clone with a hard disk thrown in. Such eye-opening figures don't endear themselves to the penny pincher in each of us—especially if we only need to back up a single PC.

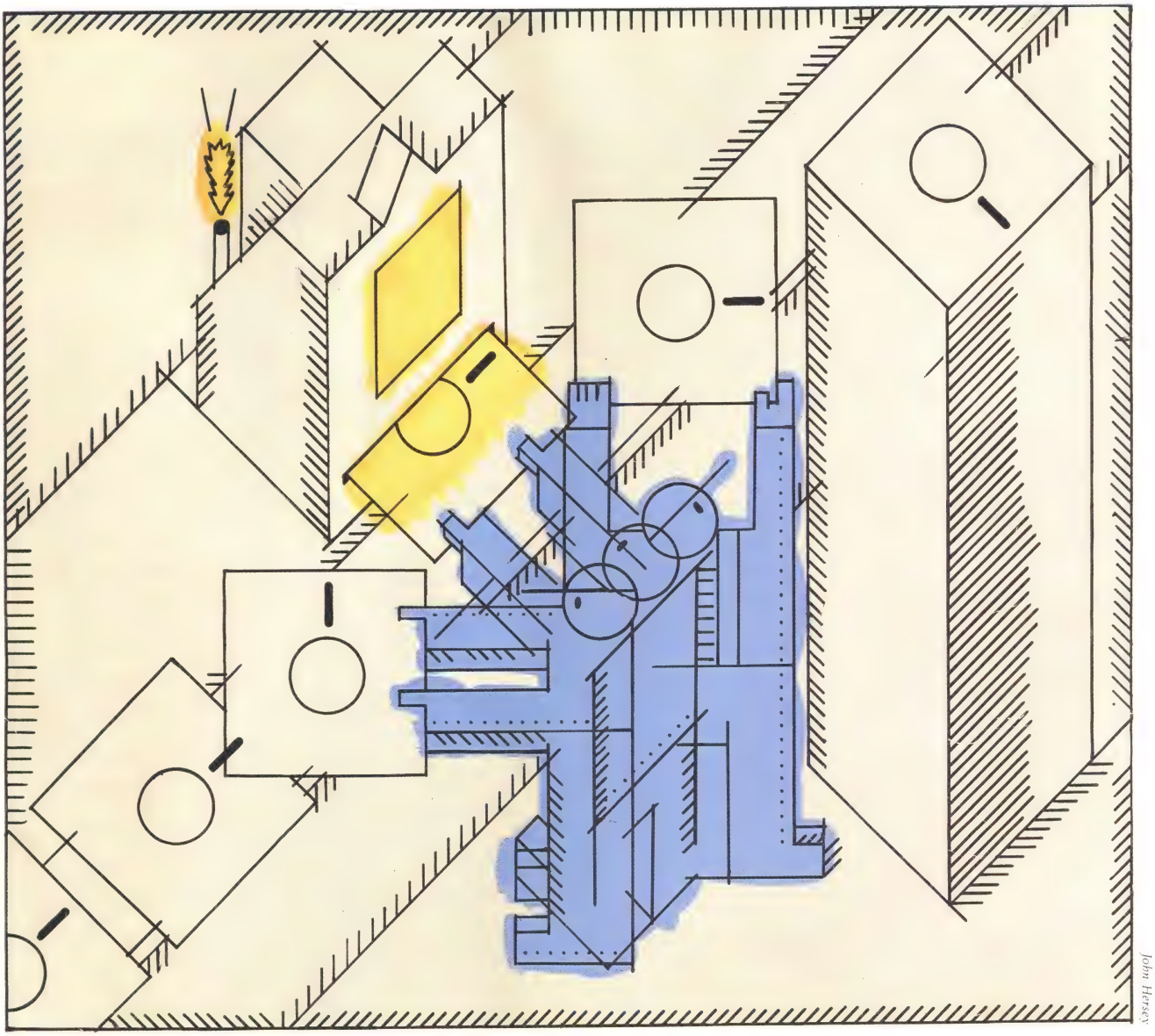
But when all is said and done, you still need to back up your hard disk. Power surges, inadvertently deleted directories and files, and plain and simple disk failure threaten to send your hard-won data into oblivion. When a single 360K floppy disk fails, you can usually rebuild your data and regain your composure. Not so if you lose 10 or 20 megabytes. It's foolish to avoid regular backups, even if each daily or weekly session forces you to swap as many as 30 disks in and out of your PC.

Floppy-based hard disk backup utilities strike a sensible and affordable balance between an expensive tape system and DOS's bare-bones BACKUP and RESTORE commands. Although you must patiently swap disks in and out, these utilities are faster, more flexible, and more convenient than the DOS functions. They beat DOS backup hands down, provide interfaces that outperform DOS's picky command syntax, and include a range of helpful features that take the mystery out of backup.

PC World tested five promising hard disk backup utilities: *Back-It, Bakup, Intelligent Backup, DSBackup +*, and *Fastback*. We scrutinized the features of each and compared their backup times with each other's and with DOS's (see Tables 1 and 2).

What'll It Be, Menus or Queries?

All of the utilities tested supplant DOS's labyrinthine command syntax with easily understandable menus and windows that help you select the files you want to back up. While the goal of any utility is



John Hersey

to make an intricate process easy, for a backup utility, ease of use is paramount. Unless a backup procedure is adaptable and easy to understand, you'll find a million reasons to neglect it. Which of the five programs you choose depends largely on which interface suits you.

Intelligent Backup uses traditional layered menus, with each menu begetting submenus in a straightforward manner. You choose menu items by moving the cursor with the arrow keys or by pressing the first letter of each command à la *1-2-3*. *DSBackup +* and *Back-It* consolidate large amounts of information in a single screen. While *DSBackup +* lists its commands inside a window, *Back-It* lists *1-2-3*-like commands across the top of the screen. *Bakup* is also menu-driven, but presents less information on its initial screen, directing you instead to the function keys for important backup functions. *Fastback*'s interface is the simplest. No menus or status information greet you. The program asks five questions and, based on your answers, begins the backup—whether you're ready or not.

Selective Backups

Regardless of which interface you prefer, the backup program must be able to archive an entire hard disk; back up specific files or directories; and back up designated types of files and directories (such as only those files that have been created or changed since your last backup session or since a designated date). The reason is simple: Many PC users can count the files they've used in any given workweek on two hands. Archiving only those files is far faster than saving an entire hard disk at each backup session. When

Table 1: Hard disk backup utilities compared

	Fastback 5.13	Bakup 3.04	DSBackup+ 1.0	Intelligent Backup 1.7	Back-It 2.0
Interface					
Command	●				
Menu				●	●
Command and menu		●	●		
Interactive	●				
Batch file	●	●	●	●	●
Backup					
Files(s) by name	●	●	●	●	●
File(s) by date		●	●		●
Files modified after designated date	●	●	●	●	●
Excludes/includes files	●		●	●	●
Directories and subdirectories	●	●	●	●	●
Excludes/includes directories	●			●	●
Scrolls selected directories		●	●	●	
Scrolls selected files			●	●	
Supports wildcards	●	●	●	●	●
Disk formatting					
Formats disks during backup	●				●
Pauses during backup			●	●	●
Error correction					
Proprietary	●				●
DOS VERIFY	●	●	●	●	●
Disk maintenance					
Keeps floppy indexes	●	●	●	●	●
Keeps hard disk indexes	●	●		●	
Prints reports	●	●	●	●	●
Prints disk labels		●	●	●	
Other features					
Estimates number of disks		●	●	●	●
Estimates number of files		●	●	●	●
Estimates backup time		●		●	
Uses DOS Format		●	●[1]		●
Copies data with DOS		●			
Exits to DOS				●	●
Compresses data	●		●	●	
Devices supported[2]	[3]	B,K,T,N	B,K,T,N	T	B,T,N
Context-sensitive help		●	●	●	●
Documentation	fair	good	good	good	fair
Toll-free phone	●			●	●
Price	$179	$179.95	$79.95	$149.95	$79.95
Copy protected					

[1] Without Speedback option
[2] B = Bernoulli Box, K = Kodak 3.3, T = tape, N = network
[3] 360K and 1.2M floppy only

it comes time to restore data after a disk mishap, you'll want to be able to restore only corrupted files rather than the entire hard disk. The utilities tested handle such selective backups well.

All the tested programs allow you to designate data for backup more precisely than does DOS. You can save time if you *exclude* unnecessary files and *include* desired files. Usually, you accomplish this by selecting one or more directories for backup and then using DOS wild cards to restrict the files within the directories. For example, you could substantially pare the data archived from one directory by excluding program files (all *.EXE and *.COM files) or all duplicate text files (*.BAK files). Conversely, including just one file type from a large directory, such as *1-2-3* (*.WKS) data base files, would reduce the size of the data set and the time required to save it.

The five tested programs provide different degrees of inclusion and exclusion. Some programs operate visually, letting you include or exclude files or directories from an on-screen list, while others require that you type critical information on a command line as you would with DOS BACKUP and RESTORE.

Fastback's question-and-answer format is disappointing for this purpose. No data about a selected data set is displayed on screen prior to backup. You can create only single-directory data sets and must include or exclude all subdirectories within a directory. One type of file group can be included or excluded using DOS wild cards.

Bakup provides more visual information than *Fastback* but no more selection flexibility. As with *Fastback*, you are restricted to one directory and can include only one file group. Although your selected data set is displayed on screen, you can't use this information to select additional files or directories to be archived.

DSBackup + restricts you to a single target directory that you designate on a command line, but you can specify up to 20 file groups for exclusion or inclusion by typing wild cards in a pop-up window. *DSBackup +* also lists designated files on screen, but, like *Bakup*, it doesn't let you manipulate them. Because *DSBackup +*'s display window is small and its archival list not arranged by directory, verifying the list before a backup can be frustrating.

Back-It provides comprehensive screen information. You can scroll through on-screen disk directories and mark directories or individual files for processing. As with *DSBackup +*, however, you must key in wild-card designations, and you cannot restrict them to a specific directory.

Intelligent Backup offers the best on-screen displays of the bunch. You can exclude or include any number of directories from a full-screen listing. Then, by displaying a chosen directory's files, you can exclude or include files one by one. Its flexibility allows you to specify several directories with different file selection parameters. Unfortunately, *Intelligent Backup*'s otherwise intuitive menu-intensive interface falters when you need to exclude an entire file group—all .EXE files, for example—because you must alter a hard-to-get-at criteria file.

Executive Summary

Fastback

Hard disk backup utility

A true speed demon, *Fastback* is for users who don't mind giving up creature comforts for raw power. It performs all important backup functions except backups by date, it formats disks on-the-fly, and it provides a proprietary error-correction scheme. However, it does not let you tinker with your backup selections, it provides limited file inclusion and exclusion, and it offers no on-screen help or file listings.

Backup speed	*Excellent*
Ease of use	*Fair*
Backup selectivity	*Good*
Floppy disk handling	*Very good*
Overall value	*Very good*

Bakup

Hard disk backup utility

It offers the best restore features, help screens, and printed reports of the bunch, but *Bakup*'s selection options are limited. It's the only program tested that forces you to begin your backup with the exact number of formatted disks required, and it beats only DOS in the speed tests.

Backup speed	*Poor*
Ease of use	*Good*
Backup selectivity	*Good*
Floppy disk handling	*Poor*
Overall value	*Fair*

Batching the Backups

Because backup procedures don't usually change from day to day or week to week, you'll quickly tire of repeatedly plowing through menus and keying in unchanged backup specifications. Each of the five tested programs lets you bypass its menu or query system and type backup instructions at the DOS prompt, and you can further streamline the process by setting up batch files. *Back-It* and *DSBackup +* let you specify backup parameters in their menus and then save the parameters to a configuration file. With both programs, you call the configuration file from within the program or from the DOS prompt or add it to a batch file for automatic execution. *Bakup, Intelligent Backup,* and *Fastback* lack configuration files, but a string of commands in a batch file will automate their backups.

With *Fastback*, you can include wild-card file groups from several directories in one batch operation; *Intelligent Backup* adds the ability to exclude specific file groups from each designated directory (see Screen 1).

The Complete Disk Juggler

The one aspect of floppy-based hard disk backup that can't be automated is the disk juggling itself. Even so, each of our tested utilities provides significant improvement over DOS's backup routines. With the exception of *Fastback*, all of the programs estimate the number of disks you'll need for backup before you begin. *Bakup* and *Intelligent Backup* also estimate the amount of time backing up will take.

A more useful feature allows you to interrupt a backup session to format new disks. A full backup of a 10MB hard disk typically requires you to have as many as 25 to 30 formatted disks on hand. If you run out of disks while using DOS BACKUP, you must abort the operation. All of the tested programs except *Bakup* provide ways around this restriction.

Fastback can format disks during the backup process; *DSBackup +* and *Intelligent Backup* will pause and let you format disks as needed; *Back-It* can do either. Only *Bakup* requires you to have the necessary number of DOS-formatted (though not necessarily blank) disks before you begin.

You normally can't use the archival data files you create until you restore them with the backup utility that created them. If the backup system uses a DOS format, however, you can copy and restore files using DOS if the program disk fails. If the backup system stores files in a DOS format, however, you can copy usable files with DOS if the backup program disk fails. But proprietary, non-DOS file formats are faster and provide other benefits. Data compression can reduce the number of disks required for backup, and proprietary file formats offer better error-correction capabilities than those provided by DOS's lim-

```
EDIT: C:\DMSDIR\FILEEXCL.TXT                                    16    2
*** top *** top *** top *** top *** top *** top *** top *** top *** top *** top
*
*                    Backup SELect/EXClude file.
*
*            Press <F1> for HELP in creating entries in this file.
*
*  As you can see, an '*' as the first character in the line notes a comment.
*
SEL C:\WPERF\*.*
SEL C:\ABASE\*.*
SEL C:\LOTUS\*.*
SEL C:\XTALK\*.*
EXC C:\*.EXE
EXC C:\*.COM
*
*
*
*** end *** end *** end *** end *** end *** end *** end *** end *** end *** end
^Insert ^Delete ^Top ^Bottom ^Start ^End ^Repeat ^Find ^Change Escape
```

Screen 1: Batch files automate intricate backup commands. Intelligent Backup enables you to include and exclude specific file groups when you set up a batch file.

ited VERIFY option. *Fastback* and *Intelligent Backup* do not use a DOS file format while the others do. *DSBackup +* gives you a choice of DOS format or its faster, proprietary format, *Speedback*.

How Do You Spell Restore?
All of the programs tested keep indexes of archived files to assist you in restoring only needed data; all five also use these catalogs to generate printed reports of the archives. *Bakup* offers the most indexing options: You can create reports by file or by directory, and a historical report summarizes all backups.

Restore procedures are similar to those for backing up: Each program lists the files in its data set to help you select those to be restored. Even *Fastback* departs from its query prompts here to present a menu of restorable files. But while the others let you mark files or directories for selective restoration before starting the process, *Fastback* immediately begins restoring a file when you tag it. Moreover, *Fastback* restricts your choices to one file or all archived files.

A program's flexibility can be double-edged. *Back-It,* for example, lets you begin a restore operation with any disk. But don't start without a printed index on hand, because *Back-It* doesn't keep an index on the hard drive. Without a printed index, you could accidentally restore just one section of a file that happens to span two archival floppies. Only the high-end products in our survey maintain catalogs on the source hard disk. If you choose either of the two under-$100 packages, you must remember to keep hard copy reports of your archives.

Your Mileage May Vary
Although speed is not the only criterion for choosing a backup utility, it's obviously important. Be forewarned, though, that speed is affected by the speed of your hard disk, the number of directories and files, the number of noncontiguous files, the numbers of buffers and files specified in your CONFIG.SYS file, and the type of error-checking methods used. Data compression techniques increase backup time by 10 to 50 percent.

With so many variables, backup times will vary significantly among systems. Nonetheless, *PC World*'s results provide a solid base of comparison. Each program backed up 10MB of data from a Plus Development Hardcard 20 (whose average access time is a peppy 49 milliseconds) installed in a 512K Compaq Portable Computer. The computer's CONFIG.SYS file set the number of files and buffers to 20. The hard disk contained 510 files in 27 directories. All tests used preformatted disks and were performed with DOS's VERIFY command turned off.

Fastback, true to its name, handled all 10MB in about 9½ minutes—three times faster than DOS. The slowest program, *Bakup,* shaved 2½ minutes off DOS BACKUP times (see Table 2).

An often overlooked speed-related issue is data verification. Every tested program offers DOS's VERIFY function for error detection. VERIFY checks that data read to the floppies matches the data written to the computer's

Executive Summary

DS Backup +

Hard disk backup utility

A relatively fast, low-cost performer, *DS Backup +* provides good file and directory manipulation capabilities, although backup parameters are limited to single directories. You can create batch file configurations easily and use DOS or *DS Backup +*'s proprietary file formats.

Backup speed	*Good*
Ease of use	*Good*
Backup selectivity	*Good*
Floppy disk handling	*Good*
Overall value	*Good*

Intelligent Backup

Hard disk backup utility

Intelligent Backup offers information-laden screens and extraordinarily flexible on-screen file selection. Its thorough but sauntering menu system will send impatient users scurrying to set up command-line batch files, and its speed test results were undistinguished. *Intelligent Backup*'s nifty auto-prompting feature reminds you when it's time to back up.

Backup speed	*Fair*
Ease of use	*Good*
Backup selectivity	*Excellent*
Floppy disk handling	*Good*
Overall value	*Good*

RAM buffers. VERIFY increases backup time, but the function is not necessarily useful; rarely do these file transfers encounter errors with or without VERIFY on. We left VERIFY off during our speed tests to ensure that test results reflected the program's, rather than DOS's, capabilities. *Back-It* and *Fastback* provide true verification methods that check whether data written to the floppies matches the source data on the hard disk. *Fastback*'s proprietary, on-the-fly error-detection technique is purportedly able to recover up to 80 bad sectors per 360K disk.

Backups Against the Wall

Back-It combines high-level performance with a low price. Its initial menu screen and *1-2-3*-like commands are clear and simple. While it doesn't offer the best file and directory selectivity, its markable on-screen directory listing is a plus, and its on-screen configuration file setup is a natural for DOS-weary users. On the other hand, *Back-It*'s report function is only adequate, and its file restoration could benefit from a hard disk index. This very good program is marred by skimpy and confusing documentation.

DSBackup + is another low-cost performer that provides a straightforward interface with good file- and directory-manipulation capabilities. Its information windows aren't as thorough as those of *Back-It,* and its displayed data sets are difficult to navigate. But the program permits you to save on-screen parameters in a loadable configuration file. *DSBackup +* restricts backups to a single directory, but its wildcard window permits easy inclusion and exclusion of files. For such a visually oriented program, the help window is small and its abbreviated language barely intelligible. However, the program's documentation is concise and well designed. *DSBackup +* rated second to *Fastback* in our speed trials.

Bakup is a study in opposites. While its menu format seems geared to the beginner, the menus themselves present less immediately accessible information than either *Back-It*'s or *DSBackup +* 's. And though its restore options are excellent, its backup selections are only adequate. While you can include backup commands in batch files, you can neither save on-screen parameters nor combine multidirectory backups into a batch file. *Bakup* is also the only program that won't let you stop and format extra disks if you find yourself shorthanded. The program provides the most comprehensive report options of the group, and its help functions are among the best, but it runs dead last in the speed category and costs the most of the programs tested.

Fastback is a quick and lean program that proffers great speed in lieu of user niceties. Its query-oriented format provides only adequate on-screen information and does not permit advance tinkering with backup and restore choices. *Fastback*'s batch-mode operation is the most comprehensive but is clearly designed for users familiar with DOS commands.

Intelligent Backup offers the greatest overall usefulness at a moderate cost. However, its practicality comes in the most menu-laden wrapper of the bunch. Its maze of menus, although well-designed, may alienate some users. Rudimentary backup commands can be slipped into batch files; more complex batch commands must be entered into the program's inadequately documented criteria file.

Still, *Intelligent Backup* does come closest of all these programs to a fully automated backup system. Its auto-prompting utility in-

Executive Summary

Back-It

Hard disk backup utility

A real bargain, *Back-It* provides an initial menu packed with information, allows you to select files and directories from on-screen lists, and formats disks on-the-fly. Its backup options, however, could be more extensive, and its reports are only adequate.

Backup speed	*Good*
Ease of use	*Excellent*
Backup selectivity	*Good*
Floppy disk handling	*Excellent*
Overall value	*Very good*

forms you of the date of your last backup and alerts you when it's time to do another. It separates files into frequently used and infrequently used categories and offers three backup operations (Full, Consolidate, and Update) to help you manage your archives. *Intelligent Backup* permits the use of wild cards with directories and includes comprehensive help screens, a file- and disk-management utility, and a text editor.

Speed Versus Convenience

No single utility excelled in every area of backup and restore operations. If raw speed is your greatest concern, *Fastback* is the obvious choice. However, its user-standoffish presentation and paltry documentation should be considered in any purchasing decision. For reasonable performance wed to an accommodating menu-driven interface, either *DSBackup +* or *Back-It* could fit the bill. *Bakup*'s dearth of inclusion and exclusion features and its relatively slow pace are offset by its restore features and head-of-the-class report options. For beginners or busy executives with no time to master the ins and outs of catalog purging and data set tracking, *Intelligent Backup* rates high.

As anyone who has steadfastly ignored DOS's BACKUP and RESTORE functions will attest, a cryptic and time-consuming backup routine simply won't get used. One of these backup utilities, though, will streamline the backup process and should have you up and juggling in no time.

Table 2: 10MB backup speed comparisons[1]

Program	Time	Number of disks required
Fastback	9:35	26
Bakup	26:35	27
DSBackup + with DOS	16:35	27
DSBackup + with Speedback	13:41	27
Back-It	14:49	28
Intelligent Backup	22:10	23
DOS	28:56	28

[1] All tests were performed with Verify off and with preformatted disks.

Art Wilcox is a Contributing Editor to PC World.

Back-It
Gazelle Systems
42 N. University Ave. #10
Provo, UT 84601
800/233-0383, 801/377-1288
List price: $79.95
Requirements: 155K, DOS 2.00 or later version

Bakup
Software Integration, Inc.
9800 S. Sepulveda Blvd. #310
Los Angeles, CA 90045
213/776-3404
List price: $179.95
Requirements: 256K with 10M hard disk, 384K with 20M or 30M hard disk; DOS 2.00 or later version

DSBackup +
Design Software, Inc.
1275 W. Roosevelt Rd.
West Chicago, IL 60185
312/231-4540
List price: $79.95
Requirements: 256K, DOS 2.00 or later version

Fastback
5th Generation Systems
7942 Picardy Ave. #B-350
Baton Rouge, LA 70809
800/228-6127, 504/767-0075
List price: $179
Requirements: 512K, DOS 2.00 or later version

Intelligent Backup
Software Laboratories, Inc.
202 E. Airport Dr. #280
San Bernardino, CA 92408
714/889-0226
List price: $149.95
Requirements: 320K of available RAM, DOS 2.00 or later version

dBASE Power Tools

Out of affection for its flexibility, frustration with its shortcomings, or a bit of both, software developers have been quick to offer utilities that polish dBASE's performance. PC World looks at six utilities that extend dBASE III Plus's power.

Tom Landini

Anthony Russo

Over 1 million data base programmers and users have given Ashton-Tate's *dBASE* series of data managers their seal of approval, but it's largely been their problems with the powerful data manager that have spurred the thriving market for add-on utilities. *dBASE*'s volumes of commands and its complex programming language quickly overwhelm nontechnical users. At the other end of the spectrum, *dBASE* programmers often find the *dBASE* language limiting for complex applications and unwieldy for routine operations.

The *dBASE* add-on market is flourishing despite *dBASE III Plus*'s notable improvements on *dBASE II* and *dBASE III*. (Features once available only as third-party add-ons—an applications generator and a custom screen painter—are now included with *dBASE III Plus*.) Even Ashton-Tate has joined the add-on lineup, targeting three utilities for the substantial market of *dBASE* programmers. The utilities reviewed here are geared primarily for pro-

grammers and experienced *dBASE* users and include a compiler, an applications generator, a code documenter, a report writer, and two packages of assorted *dBASE* routines and programs.

Compilers and Interpreters

Language compilers are one of *dBASE*'s strongest add-on markets. Applications developed entirely with *dBASE* require *dBASE*'s relatively slow interpreter. An interpreter translates an application's source code character by character—including nonessential program references—and performs the desired operations.

Applications developers, however, favor compiled applications. Compilers translate source code into instructions that the computer can read and execute either directly or with minimal intermediate steps. Consequently, compilers have faster execution times than interpreters. More important to *dBASE* programmers, however, is compiled applications' ability to run independently of *dBASE*, which means *dBASE* applications can be sold to people who don't own a copy of the program. And compiled applications can operate without the programmer's original source code, providing the programmer with a degree of copyright protection that interpreted applications usually lack. A compiler's sole disadvantage is that the programmer cannot tinker with a compiled program without returning to the source code.

Quicksilver

Quicksilver is WordTech Systems' *dBIII Compiler* updated for *dBASE III Plus*. Like its predecessor, *Quicksilver* maintains lockstep compatibility with the *dBASE* language. But *Quicksilver* is faster than *dBIII Compiler* and *dBASE III*'s interpreted code and runs neck-and-neck with its rival compiler, Nantucket's *Clipper*. *Quicksilver*'s numerous extensions to the *dBASE* language allow programmers to design elaborate windows, create functions within *dBASE*, and access low-level machine functions.

Like *dBIII Compiler*, *Quicksilver* produces a pseudocode (called d-code) that is executed with an embedded run-time interpreter. However, *Quicksilver* also gives the developer the option of compiling applications straight through to optimized native code. The d-code option offers automatic memory overlay management (allowing large applications to run on systems with minimal memory capacity) and compiles and links files quickly. Programmers will find the d-code option convenient for altering program code during program development, but they will probably take advantage of the optimizer's speed for final production. Optimized *Quicksilver* applications operate faster than *dBASE III Plus* or d-code and are on a par with applications produced by Nantucket's Autumn '86 release of *Clipper* (see Figure 1).

Quicksilver uses or creates *dBASE III Plus* data base, index, and memory variable files, and existing *dBASE III Plus* applications compile easily with little or no modification. The most critical manual operation is to replace macros that contain either commas or *dBASE*'s reserved words. *Quicksilver* smoothly compiles *dBASE III Plus* applications that contain procedure files, even when the procedures and procedure files have identical names. The program also comprehends applications with multiple identical procedure names in different procedure files. Both these circumstances occur frequently when you

use an applications generator such as *Genifer*. Compiling these applications with *Clipper* requires major code surgery.

With *Quicksilver* WordTech bundles a powerful debugger, which programmers can use like an interpreter during program development. They can halt program execution at various break points to examine and manipulate code, memory variables, and data base status. With the debugger, programmers may need the *dBASE* interpreter only for creating report and label form files or data bases with memo fields.

Quicksilver's extensions to the *dBASE* language provide access to low-level machine functions with operating system interrupts, bit manipulation, and port addressing. Special environmental variables give *Quicksilver* applications access to the DOS command line, and a complete and flexible set of windowing commands enables programmers to create elegant applications. Programmers may define custom functions with the *dBASE* language or with C.

Set Autolock, one of *Quicksilver*'s handiest commands, automates intricate file- and record-locking operations in multiuser *dBASE* applications. Companion

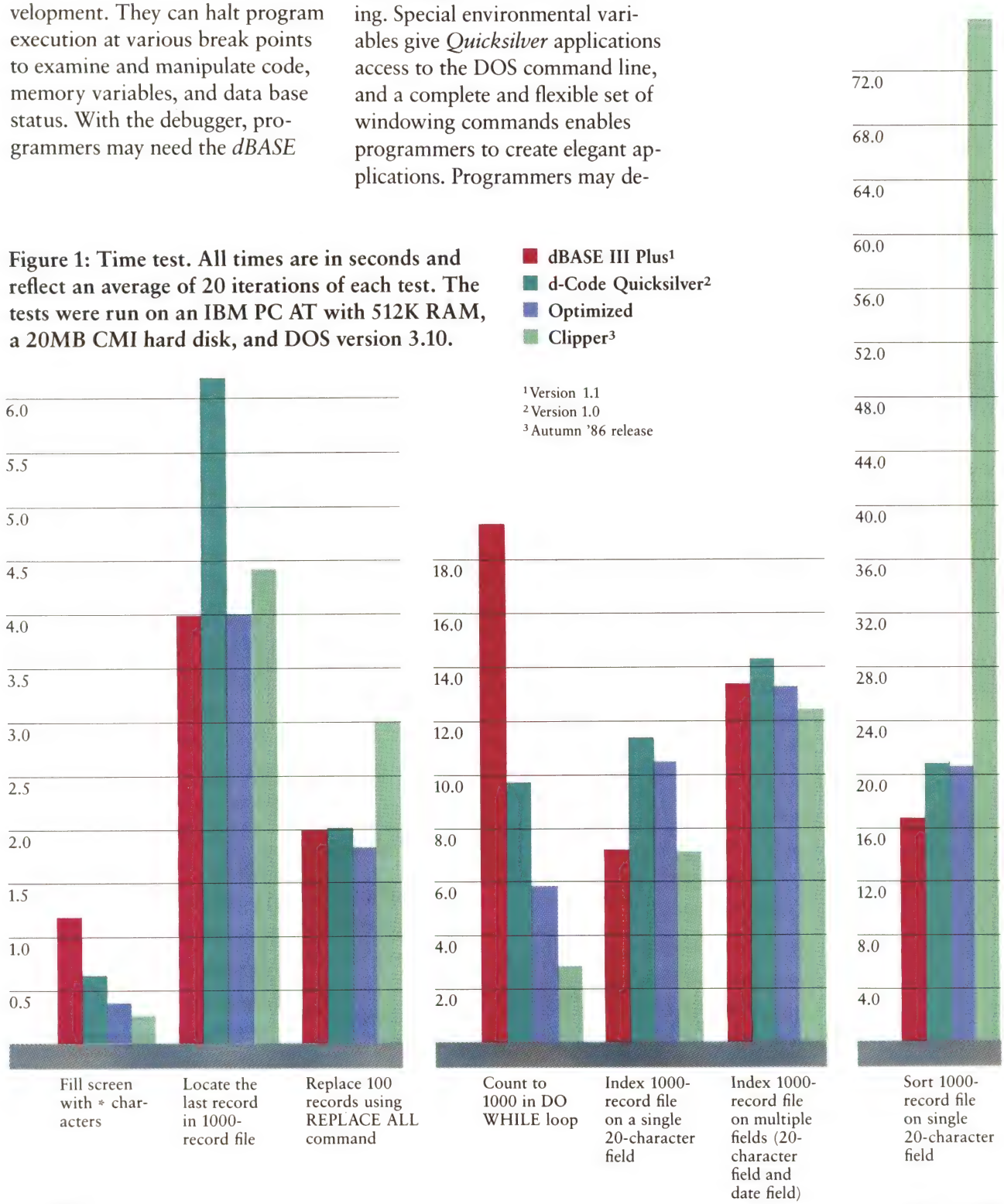


Figure 1: Time test. All times are in seconds and reflect an average of 20 iterations of each test. The tests were run on an IBM PC AT with 512K RAM, a 20MB CMI hard disk, and DOS version 3.10.

commands Set Delay and Set Retry respectively specify a delay interval in seconds for retrying locks when a file is in use and set the number of times to retry. Although useful, the locking process has an irritating glitch. When the program completes the designated number of retries, it aborts and returns you to DOS. It does remember to close your files before aborting.

Using any of *Quicksilver*'s extensions, however, means you depart from the *dBASE* language standard. When you need to provide strict compatibility with the *dBASE III Plus* interpreter, you can enclose *Quicksilver*'s unique commands and functions with */. *Quicksilver* will compile these lines, but *dBASE III Plus* will treat them only as comments.

Quicksilver is a worthwhile addition to any application developer's tool chest. Its speed, language extensions, and compatibility with *dBASE* should give Ashton-Tate and Nantucket a run for their money in the *dBASE III Plus* programmer's market.

dBASE Programmer's Utilities

Ashton-Tate's *dBASE Programmer's Utilities* is a significant entry in the add-on product derby, not simply because it was written by *dBASE* author C. Wayne Ratliff and Ashton-Tate heavyweights Jeb Long and Robert Byers, but also because it shows Ashton-Tate's strong interest in the programmer's market. In a bow to pragmatism, some of the utilities are also supplied as object code files that can be used with Nantucket's *Clipper* compiler.

The package contains 35 utilities in three categories: assembly language modules that can be embedded into *dBASE* code, stand-alone programs that operate on *dBASE* data and program files, and general-purpose DOS-level programs. The assembly language modules must be loaded and called from *dBASE III Plus* code. The stand-alone programs execute directly from the DOS command line. None of the programs are revolutionary—many, in fact, can be found in the public domain—but the package is inexpensive and well presented.

One of the most useful assembly language modules is Menubar, which produces scrolling, lightbar, multiple-column menus. Other modules let programmers add professional polish to screen displays by controlling brightness or dimness, filling a screen area with color and/or special characters, or saving and instantly redisplaying up to five screens. A Soundex routine finds homonyms in a data base. Modules for accessing parallel and serial ports add flexibility in coding the likes of telephone dialers and printer utilities. Dprotect offers a simple data base protection scheme, Drepair is an indispensable data base repair program that executes rapidly, and Dxref provides programmers with code analysis, debugging, and variable cross-referencing.

dBASE Programmer's Utilities' stand-alone DOS programs include powerful routines that copy entire directories of files in one shot and perform global searches for files or text strings. They can be dangerous if not used carefully: Direrase, for example, erases entire directories, and Rm erases files and directories.

Executive Summary

Quicksilver

Compiler

WordTech Systems hits the *dBASE III Plus* market with a very fast, very compatible *dBASE* compiler. You can create applications in easily manipulated, interpreter-run "pseudo code" before translating through to faster, stand-alone native code. The program includes an excellent debugger, windowing commands, and other useful *dBASE* language extensions (which can be disabled for clone-like dBASE operation).

Compilation speed	*Excellent*
dBASE compatibility	*Excellent*
Language extensions	*Good*
Documentation	*Good*
Overall value	*Excellent*

dBASE Programmer's Utilities

Utility package

An inexpensive melange of *dBASE* programmer's utilities, *dBASE Programmer's Utilities* groups 35 useful programs and routines in one well-organized and well-written package. Most of the offerings can be found in the public domain, but the product is significant because it indicates Ashton-Tate's strong interest in the *dBASE* programmer's market.

Usefulness	*Good*
Ease of use	*Good*
Documentation	*Excellent*
Overall value	*Good*

The Documentor

Programmers who are enthusiastic about developing *dBASE* applications are usually equally unenthusiastic about maintaining existing applications, especially those written by another programmer. Such application maintenance is all the more difficult because programmers do not always maintain the underlying nitty-gritty technical documentation. And deciphering an undocumented application's inner meaning is time-consuming and frustrating for a programmer and costly for a data base user.

The Documentor from WallSoft Systems is a gem. It produces high-quality, well-organized technical documentation with a minimum of effort and works with all versions of *dBASE II, III,* and *III Plus.* A single command sets *The Documentor* in action scanning an entire application. The program produces a plethora of reports, including action diagrams of the code; listings of variables and data base fields and the line numbers where they occur and are updated; outlines of complete data base and index file structures; and high-level outlines of all modules in the application and their interrelationships (see Screen 1). The program caps its reports with a useful table of contents.

The Documentor is menu driven and can be customized to suit a programmer's needs. Any report option can be suppressed or included, and a search facility can restrict reports to occurrences of specific *dBASE* commands, data base fields, or variables. Even page headings for printed reports can be specified.

WallSoft's warranty and customer support policy are noteworthy. The company offers a complete refund within 30 days of purchase if the customer isn't satisfied. Knowledgeable and prompt technical support is available with a toll-free phone number.

```
C:\NEWPARK\PARK_MAIN
├──BACK(BACK)
│   ├──FILELOCK(BACK)
│   │   └──FLOCK
│   └──FLOCK
├──LABELS
├──LEASE(LEASE)
│   ├──ADD(LEASE)
│   │   ├──CHK_DUPL(LEASE)
│   │   │   └──DISP_MSG(LEASE)
│   │   ├──GET_FLDS(LEASE)
│   │   ├──GET_KEY(LEASE)
│   │   ├──INIT_FLD(LEASE)
│   │   ├──INIT_KEY(LEASE)
│   │   ├──SAVE_REC(LEASE)
│   │   │   ├──FILELOCK(LEASE)
│   │   │   │   └──FLOCK
│   │   │   ├──FLOCK
│   │   │   ├──GET_OPTN(LEASE)
│   │   │   └──REPL_REC(LEASE)
│   │   │       ├──RECLOCK(LEASE)
│   │   │       │   └──RLOCK
│   │   │       └──RLOCK
│   │   └──VAL_REC(LEASE)
```

Screen 1: A program hierarchy outline produced by The Documentor. The outline gives an overview of a complete system, including all programs and procedures.

dAnalyst

TransSec's *dAnalyst*, an inexpensive and easy-to-use programmer's development utility for *dBASE II, III,* or *III Plus* applications, offers useful syntax checking, action diagramming, and variable cross-referencing routines. A particularly nice feature produces a DOS batch file that backs up all program and data files to a floppy disk.

What sets *dAnalyst* apart, is its ability to add record-locking and file-locking commands to existing *dBASE III Plus* code. Programmers just acquainting themselves with *dBASE III Plus*'s intricate multiuser environment will reap much from this function. Into an application, *dAnalyst* inserts routines that call two simple procedures that are included with the program. While *dAnalyst* cannot substitute for the wisdom of an experienced LAN programmer, it helps *dBASE* programmers contend with unfamiliar coding techniques. *dAnalyst* also provides multiuser support for *Clipper, dBIII Compiler,* and *Quicksilver.*

Genifer

Genifer is a slick program generator that gracefully produces sophisticated *dBASE* applications. It creates applications that include most common data base functions—menus, data base maintenance and inquiry screens, and custom designed reports—and can include up to nine related data base files. Its applications generator and report generator outshine

dBASE III Plus's. The report generator allows you to define an entire report page with multiple-line headers and footers for up to nine levels of subtotals. Each header or footer can include totals and averages.

Creating an application with *Genifer* is a three-step process: You define fields and files with *Genifer*'s Data Dictionary (see Screen 2); specify the application's menus, maintenance and inquiry screens, and reports; and let *Genifer* generate the program code. Each operation is accessed quickly from *Genifer*'s main menu with a single keystroke. All functions provide consistent, well-defined entry screens.

Genifer's Definition module uses the Data Dictionary along with any popular text editor to create specifications for menus, data base maintenance or inquiry screens, or report programs. You define all screens and reports by "painting" them with the text editor rather than by laboriously coding specifications with row and column coordinates. Calculated fields (those containing formulas) can be defined.

Genifer produces programs by combining skeleton files (files containing the generic code for all programs of one type) with Data Dictionary and definition file information. Programmers can modify the skeletons to create custom menu programs and file formats throughout all generated programs.

Programmers can use *Genifer* to rapidly create applications prototypes. A relatively sophisticated prototype can be developed in as little as an hour and presented to a client for review and comment. The client gets a better feel for the finished product and can suggest changes early in the programming process. *Genifer*'s ease of use also makes it a viable tool for the intrepid intermediate-to-advanced end user. Mastering the program is easier and quicker than mastering *dBASE*. Nevertheless, users

```
Data Dictionary                                   LEASE field definition

    * Field name                                  LEASEDATE

    Type (Character/Numeric/Date/Logical)         D

    Length (with decimal point & digits)          8

    Number of decimal places                      0

    Default value                                 ctod('  /  /  ')

    Validate against (Range/List/File)

    Picture (9/#/A/L/N/X/!/$/*/@function)         @D

Ret/Beg/End/Next/Prev/Modify/Add/Copy/Delete/Tally/Help/Quit?
```

Screen 2: In addition to stipulating field name, type, and length, programmers can specify default values, picture clauses, and data validation options in Genifer's Data Dictionary. All generated programs use the dictionary's field descriptions to ensure consistency throughout a system.

Executive Summary

The Documentor

Documentation writer

A godsend for *dBASE* programmers, *The Documentor* produces high-quality, well-organized technical documentation of *dBASE II, III,* and *III Plus* applications with minimal effort.

Graphic diagramming	*Excellent*
Command and variable searching	*Excellent*
Thoroughness of output	*Excellent*
Documentation	*Good*
Overall value	*Excellent*

dAnalyst

Utility package

An inexpensive utility package that converts *dBASE III* applications to *dBASE III Plus* applications with record- and file-locking for multiuser systems, *dAnalyst* eases *dBASE* programmers into *dBASE III Plus*'s complex multiuser environment. The program's other features are useful, but most are available in the public domain.

dBASE conversion	*Excellent*
Program analysis	*Excellent*
Ease of use	*Good*
Documentation	*Fair*
Overall value	*Excellent*

should not tackle *Genifer* without a solid grounding in the basics of relational data management and *dBASE III*'s data base and index file structures.

To get users up to speed, *Genifer* includes a complete sample application on disk that serves as an interactive tutorial. Unlimited free telephone support is included, although the number is not toll-free.

R&R Relational Report Writer

R&R Relational Report Writer from Concentric Data Systems offers the kind of powerful reporting options that should be a part of *dBASE III Plus*. Many *dBASE* programmers tackled *dBASE* only because the program's limited Report Form didn't do what they needed. Had a report package as thorough as *R&R* been available earlier, the ranks of *dBASE* programmers might be smaller.

R&R Relational Report Writer is Concentric Systems' second *dBASE* report utility. Its first, *db Report Writer*, is a disappointing add-on for *dBASE II* and *III*. It restricts reports to single data files and truncates text fields at 50 characters. Concentric Systems obviously learned from *db Report Writer*, because *R&R* is a delight.

R&R users define reports by painting the screen with data base and text fields and selecting options from a straightforward interface that mimics *1-2-3*. Report formats are built line by line. Lines may belong to the report's body, header, footer, or summary, with up to eight levels of control breaks (subtotals). Each break may have its own multiple-line header and footer. Virtual fields, including those used for totals, averages, and counts, are available and can even include totals of other calculated fields.

R&R's most powerful options control multiple-file reporting. The program creates and displays a composite record that includes fields from all selected files, with appropriate visual nesting or indentation and graphics marks that indicate the relationships among files and fields—one-to-one or one-to-many (see Screen 3). The composite record's display can even include calculated fields. The composite record is always available via the <F10> key.

R&R provides useful functions for formatting or manipulating field and text information. Any programmer who has coded word-wrap routines and faced the slow report execution that results will welcome *R&R*'s automatic word wrap for character and memo fields.

R&R can nest up to five levels of fields in ascending or descending order. Existing *dBASE III Plus* index files can help you order data, a good idea since *R&R* sorts files slowly. You can select up to eight fields for grouping records and up to eight levels or categories in a report format. You can print either the first or every occurrence of a field and create page breaks whenever a field changes. *R&R* supports a wide variety of printers with multiple configurations, such as the Hewlett-Packard LaserJet's landscape and portrait modes. A user-printer customization function allows you to designate unlisted printers.

Programmers will find *R&R*'s Runtime module particularly useful. Runtime executes *R&R* reports from the DOS command line or can be embedded in *dBASE III* and *III Plus* code and called with *dBASE*'s Run command.

Executive Summary

Genifer

Applications generator

Experienced *dBASE* users and programmers will find *Genifer* useful for quickly generating *dBASE* programs. Programmers can create applications prototypes with minimal effort, and experienced users will reap greater benefit from time spent learning *Genifer* than learning *dBASE*. This sophisticated program requires familiarity with *dBASE* expressions and is not recommended for *dBASE* novices.

Quality of generated code	*Excellent*
Formatting flexibility	*Excellent*
Report writing	*Good*
Documentation	*Good*
Overall value	*Very good*

R&R Relational Report Writer

Report writer

The consummate *dBASE* report writer, *R&R* is a vast improvement over Concentric Data Systems' earlier *db Report Writer*. This comprehensive, menu-driven program leaves little to be desired, although plowing through its thorough but dense manual takes some commitment.

Formatting flexibility	*Excellent*
Program execution	*Excellent*
Ease of use	*Excellent*
Documentation	*Good*
Overall value	*Excellent*

Runtime options allow you to designate starting and ending page numbers, scope limitations (which restrict the records read by the program), and an escape command (allowing users to stop and resume report execution).

Like *Genifer, R&R Relational Report Writer* is comprehensive and easy to learn, making it a wise addition to the programmer's library and a good choice for the advanced or adventurous intermediate *dBASE* user. Because *R&R*'s report capabilities are more sophisticated than those of *dBASE* or *Genifer,* the program is a best bet for prototyping *dBASE* reports.

A Utility for All Reasons

Because *dBASE* is so prevalent and the *dBASE* programmer's market so entrenched, the add-on market is large and diverse. Software developers will continue to work within—or around—the *dBASE* language to beef up the indefatigable data manager's power and utility. In the free-for-all *dBASE* utilities market, *dBASE* programmers and users are the clear winners.

Tom Landini is a microcomputer consultant and programmer in Washington, D.C.

dAnalyst version 5.7
TranSec Systems, Inc.
1802 N. University Dr.
Plantation, FL 33322
800/423-0772
List price: $74.95
Requirements: dBASE II, dBASE III, or dBASE III Plus; 128K; DOS 1.00 or later version
Not copy protected

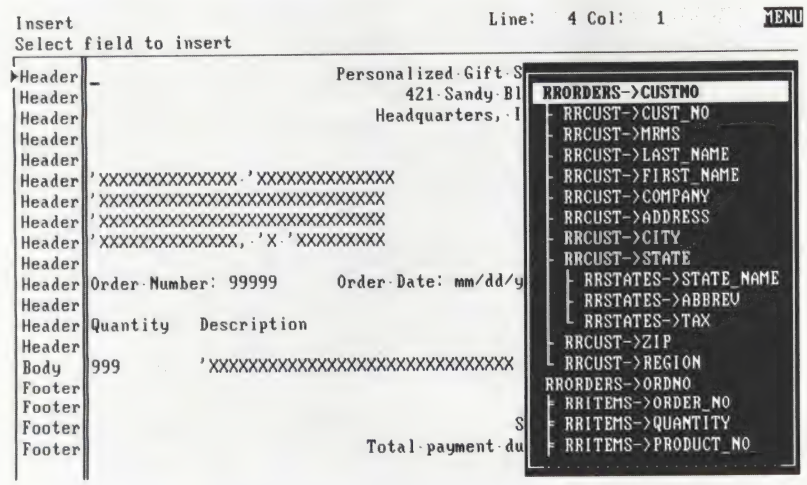
dBASE Programmer's Utilities
Ashton-Tate Publishing Group
20101 Hamilton Ave.
Torrance, CA 90502-1319
800/437-4329, 213/329-8000
List price: $89.95
Requirements: dBASE III or dBASE III Plus, 256K, DOS 2.00 or later version
Not copy protected

The Documentor version 1.01d
WallSoft Systems, Inc.
233 Broadway #869
New York, NY 10279
800/233-3569, 212/406-7026
List price: $195
Requirements: dBASE II, dBASE III, or dBASE III Plus; 256K of available RAM; DOS 1.00 or later version
Not copy protected

Genifer version 1.01
Bytel Corp.
1029 Solano Ave.
Berkeley, CA 94706
800/631-2229, 415/527-1157
List price: $395
Requirements: dBASE III or dBASE III Plus, 256K of available RAM, DOS 2.00 or later version
Not copy protected

Quicksilver version 1.0
WordTech Systems, Inc.
P.O. Box 1747
Orinda, CA 94563
800/525-9500, 415/254-0900
List price: $599, file server module $99
Requirements: 256K of available RAM, DOS 3.10 or later version
Not copy protected

R&R Relational Report Writer version 1A
Concentric Data Systems, Inc.
18 Lyman St.
P.O. Box 4063
Westboro, MA 01581
800/325-9035, 617/366-1122
List price: $99
Requirements: dBASE III or dBASE III Plus, 256K, DOS 2.00 or later version
Not copy protected



Screen 3: R&R Relational Report Writer's composite record displays all fields in a report, including linkages between files. The hyphens denote a one-to-one relationship between files, while question marks would signify a one-to-many relationship.

Reflex Workshop's Forms That Fit

If you like Reflex the Analyst, you'll love the Reflex Workshop, a potpourri of tracking and analytical tools geared to the small business.

Stephen A. Blumenthal

Reflex the Analyst, the fast, friendly data base manager, made quite a splash when it was introduced in 1985. Flouting convention, the program (then known simply as *Reflex*) combined data management prowess with the analytical and forecasting functions of a spreadsheet and topped it off with quick and easy business graphics capabilities. Today, *Reflex the Analyst*'s ease of use makes it a continuing favorite among data management novices (see "Reflex: Analysis With Finesse," *PCW,* September 1985).

Now Borland International has increased *Reflex the Analyst*'s usefulness and accessibility by introducing a complementary product called *Reflex Workshop.* This new package provides 22 templates for everyday business tasks, such as scheduling appointments, generating mailing lists, managing projects, tracking expenses, and analyzing sales trends. The product is geared toward managers; it won't replace most of your company's standard procedures for tracking information, but it will allow you to analyze data quickly and effectively. And if you aren't familiar with data management programs, the templates will serve as an excellent learning tool. Of course, the beauty of using templates is that most of the setup work is already done. If your needs parallel the *Workshop* examples, all you need do is erase the sample information and insert your own; the field names, formulas, and formats will remain intact. And if the forms don't fulfill your needs, you can easily redesign them.

For $69.95, you get two *Workshop* disks (one is for Hercules Graphics Card users) and a 407-page manual. The manual is a study in clarity—you don't have to stumble through jargon or fumble to find information. The first chapter introduces *Reflex the Analyst*'s capabilities, which you must understand to use the templates successfully. The bulk of the book is organized around the principle that the best way to learn a program is to use it. As you work through each example in the manual, you can call up a related data base file from the *Workshop* disk, complete with graphs and reports, and get hands-on experience with *Reflex the Analyst.* Furthermore, the manual explains the logic behind each data base's design so that you can easily determine whether the templates suit your applications.

Using *Workshop* requires familiarity with the five "views" of data that *Reflex the Analyst* permits: Form View, for building a data base; List View, for displaying the data in list form (like a spreadsheet); Crosstab View, for comparing and cross-totaling data between records; Graph View, for displaying the data graphically; and Report View, for printing out

Paul Meisel

the information. The 22 templates fall into five categories: administration, accounting, financial planning, marketing and sales, and production and operations. What follows is a bird's-eye view of this landscape.

Painless Administration

Suppose you want to hire an assistant manager. Screen 1 illustrates the *Workshop* form used to enter each applicant's vital statistics—name and address, current salary, educational level, career objective, interview date, and so forth. Although data entry is an easy process, you must enter information in specific formats. If you type $45,000 into the Salary field, for example, the program beeps and displays an error message. The only acceptable format is 45000—not the most obvious choice.

Once you've entered the relevant information, you can use *Reflex the Analyst*'s filtering capacity to display a list of records meeting whatever criteria you choose. All you do is type in the filter conditions (for example, display all candidates with a bachelor's degree or higher and a willingness to relocate). The program creates a subset of the file that you can treat as your working data base.

Using the Crosstab View, you can compare data between records. Thus, you can cross-examine the educational levels and career objectives of your applicants, as well as analyze how each applicant's current salary compares to the average salary of all the applicants (see Screen 2). And once you've decided whom to call in for an interview, you can use the *Workshop* to create an appointment schedule, automatically generate prewritten form letters either offering the position or regretfully rejecting the candidate, and prepare mailing lists and labels for printing. Unfortunately, *Reflex the*

Analyst prints only one record per report row; however, you can modify the design of the data base to print mailing lists and labels three across.

For the time-conscious, the *Workshop* lets you set up an elaborate scheduling system for yourself, your boss, or your entire department. You can create a schedule of the week's appointments, produce a table summarizing the number of appointments each person has, maintain a daily departmental list of appointments, and generate printed appointment reports for yourself and other employees, complete with reminders about the purpose of each meeting.

These capabilities are sophisticated enough to satisfy the scheduling needs of most small businesses. What's more, the *Reflex Workshop* provides a special template for planning business meetings and tracking conference facilities. To avoid accidentally scheduling two meetings at once, you can query the list of business meetings to determine when and where space is available for a given day and the time and location of each meeting. The *Workshop* also lets you generate a report summarizing conference room activities.

Now that project management software is all the rage, you may want to consider one of the *Workshop* templates as your entry into the field. Using a small construction project as an example, the *Workshop* shows you how to track and manage relevant tasks. You can isolate and list tasks that are running behind schedule, rate the efficiency of project supervisors, provide supervisors with weekly task lists, and generate a summary task list for the entire project. *Scitor* this is not, but if you run a small business, the *Workshop* may be all you need to make sure projects are completed on time.

Settling Accounts

For some users, the accounting templates alone may justify the price of the *Workshop*. Remember, though, that the product is designed primarily for tracking and analytical purposes, so don't expect the accounting templates to replace your full-fledged accounting software. The *Workshop*'s strong point is that it helps you analyze information and pinpoint problems without having to resort to cumbersome formulas or abstruse command languages. You can use the accounts receivable template, for example, to automatically age accounts and to track outstanding accounts by invoice number, customer account number, description of transaction, and amount due (for example, all outstanding accounts over $1000). The resulting accounts receivable report includes a detailed analysis of invoice payment status and a summary of all outstanding items (see Figure 1). Once you know which invoices are late, you can take corrective action.

Similarly, the template that lets you organize outgoing purchase orders helps reduce late receipt of goods and services and streamlines the payment process. You can isolate purchase orders in

Screen 1: This form is used for entering job applicant information.

```
40925
Views    Edit    Print/File    Records    Search    Form
FORM
                APPLICANT TRACKING & INQUIRY SYSTEM

Date Application Filed: 15-Jan-87                    Sex: F
Name: Amelia Anderson                Phone #: 230-2089
Company: Anderson Associates
Address: 111 Orange Ave.
City: Concord                  State: CA          Zip Code: 95843

Current Salary: 40,925         Objective: Assistant Manager/Marketing
Education Code: 3              Education: B.A./B.S.
Inquiry Code: 1                Inquiry: Walk in

Will Relocate? [Yes\No]: No
Reference Contact Date: 19-Jan-87
Comments: 10 years' experience in marketing

Interview Date: 22-Jan-87      Starting Date: 2-Feb-87
Offer Made: Yes                Position: Assistant Marketing Manager
Date Decision Made: 22-Jan-87  Starting Salary: 45,000
```

Executive Summary

Reflex Workshop

Data management utility

For *Reflex the Analyst* users, *Reflex Workshop* provides 22 templates for managing and manipulating business data used in administration, sales and marketing, accounting, financial planning, and production and operations. *Reflex Workshop* is also an excellent learning tool for novice data base users.

Range of applications	*Good*
Customization	*Good*
Tutorial value	*Excellent*
Ease of use	*Excellent*
Overall value	*Excellent*

which invoice amount exceeds authorized departmental figures and use this information to determine which departments consistently overspend their budgets.

A related template uses the same logic to track business expenses by department, employee, month, and account. You can compare the relative spending of employees and generate a report that lists quarter-to-date expenditures by department and account, in dollars or percentage points. As a manager, you may want to use this template to quickly determine where the funds are going at any given time, especially if your company's accounting department issues expense reports only on a quarterly and annual basis. And because petty cash often disappears without a trace, most office managers will welcome the template that lets them track petty cash outlays by department and by purpose, as well as generate periodic petty cash reports.

Financial Planning

Some of the *Workshop*'s most sophisticated templates are collected under the financial planning rubric. You can track and analyze your company's debits and credits, for example, and create trial balance reports listing recent transactions. Because such data is likely to come from diverse corporate departments, *Reflex the Analyst* imports financial data in DIF or ASCII format and can read data from *1-2-3, dBASE, Symphony,* and *pfs:file.*

Commercial real estate agents will appreciate the template that helps match commercial properties against a list of customer needs. This template helps increase your productivity because you can set search conditions while your client describes the ideal property and immediately suggest an appropriate offering. You can also query the data base about the average cost per square foot of property according to location, as well as compare property grades (a subjective ranking). The summary report lists each property within a prespecified classification (such as heavy industrial, warehouse, or retail) by lot number, square footage, price per square foot, monthly rent, and location.

Other templates let you track and analyze leased inventory and fixed assets. If you rent equipment, you can determine how

@AVG
Views Edit Print/File Records Search Crosstab

CROSSTAB
Summary: @AVG Field: Current Salary

Education	ALL	=%@AVG(Current Salary)
B.A./B.S.	37,899	111%
Doctoral	38,547	113%
High School	25,814	76%
Junior College	31,875	93%
Masters	44,288	130%
ALL	34,156	100%

Screen 2: Crosstab view lets you analyze how each applicant's current salary compares to the average salary of all the applicants.

much you owe to each lessor and examine the age, annual depreciation, accumulated depreciation, and book value of the assets. Another *Workshop* template lets you record fixed assets by asset number, description, location, date acquired, and audit history for accounting and insurance purposes. By using a calculated field (one that contains a formula using values stored in other fields) you can create lookup tables and automatically calculate the next audit date for each asset. By far, this template's most useful feature is its report function, which allows you to generate a checklist of assets so auditors can locate the items quickly during periodic inspections.

Marketing and Sales

Even if you're not trained in market research, the *Workshop* can help you evaluate how well your products are doing. Templates are available to track sales leads and store inventory; analyze the performance of sales reps and product lines; and examine sales and marketing trends by day, month, or quarter, and by region. The templates in this category are particularly useful for regional sales managers who want to stay on top of sales and employee performance trends instead of waiting for the marketing department to issue such data.

Suppose your products are sold in department stores, discount stores, specialty boutiques, and mail-order houses. Given such wide-ranging distribution, it certainly would be useful to find out where your merchandise sells best. Once you've entered your company's inventory data and customer record information into the store inventory template, you can use *Reflex the Analyst*'s Graph view to analyze the relationship between product sales and type of store (see Screen 3). You can also analyze how much product price varies by type of store (because some stores will discount your merchandise) and prepare a report summarizing both the average price per store and the average overall price.

Production and Operations

Sophisticated data management programs like *dBASE III* are commonly used in businesses to track and analyze quality control

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10:15 am

A C C O U N T R E C E I V A B L E S T A T U S
(by Invoice Number)

Invoice	Amount Due	Date Sold	Date Due	Invoice Status
850001	$120,000	3-Sep-85	3-Oct-85	Past Due
850002	$2,455	15-Sep-85	15-Oct-85	On-time payment
850003	$1,095	3-Jul-85	2-Aug-85	Paid Late
850004	$6,295	8-Mar-85	7-Apr-85	On-time payment
850005	$46,753	2-Jul-85	1-Aug-85	Past Due
850006	$956	1-Mar-85	31-Mar-85	On-time payment
850007	$25,046	1-Apr-85	1-May-85	On-time payment
850008	$47	4-Aug-85	3-Sep-85	On-time payment
850009	$784	14-Jun-85	14-Jul-85	On-time payment
850010	$1,350	5-Mar-85	4-Apr-85	On-time payment
850011	$51,923	12-Jul-85	11-Aug-85	Paid Late
850012	$417	26-Aug-85	25-Sep-85	On-time payment
850013	$545	23-Aug-85	22-Sep-85	Paid Late
850014	$54	23-Jul-85	22-Aug-85	On-time payment
850015	$432	1-Aug-85	31-Aug-85	Paid Late
850016	$7,013	12-Jun-85	12-Jul-85	Past Due
850017	$318	7-Jun-85	7-Jul-85	On-time payment
850018	$1,563	31-May-85	30-Jun-85	On-time payment
850019	$38	1-Jul-85	31-Jul-85	On-time payment
850020	$549	1-Jul-85	31-Jul-85	On-time payment
850021	$435	23-Jul-85	22-Aug-85	Past Due
850022	$9,392	12-Jun-85	12-Jul-85	On-time payment
850023	$1,999	1-Sep-85	1-Oct-85	Past Due
850024	$4,368	5-Jul-85	4-Aug-85	On-time payment
850025	$6,621	23-Aug-85	22-Sep-85	On-time payment
850026	$495	29-Jul-85	28-Aug-85	On-time payment
850027	$1,466	12-Aug-85	11-Sep-85	On-time payment
850028	$1,533	30-Jun-85	30-Jul-85	Past Due
850029	$7,566	2-Jun-85	2-Jul-85	On-time payment
850030	$4,932	11-Sep-85	11-Oct-85	Past Due
850031	$86	2-Sep-85	2-Oct-85	Past Due
850032	$1,741	3-Aug-85	2-Sep-85	Past Due
850033	$641	12-Aug-85	11-Sep-85	On-time payment
850034	$1,071	2-Aug-85	1-Sep-85	On-time payment
850035	$12,315	11-Aug-85	10-Sep-85	On-time payment
850036	$1,566	12-Aug-85	11-Sep-85	On-time payment
850037	$4,435	11-Aug-85	10-Sep-85	On-time payment
850038	$897	12-Aug-85	11-Sep-85	Paid Late
850039	$4,526	9-Aug-85	8-Sep-85	On-time payment
850040	$199	24-Aug-85	23-Sep-85	Past Due

Invoice Age Summary [outstanding items only]:

	0-30	31-60	61-90	91-120	> 121	Total
$ Amount:					184,692	184,692
Avg Age:					431	431
Count:	0.00	0.00	0.00	0.00	10.00	10.00

Figure 1: This accounts receivable report lists the status of each invoice and summarizes outstanding items.

and production cost data. The *Reflex Workshop* templates in this category won't replace such controlled tracking systems, but they're excellent for ad hoc study of production trends and are especially recommended for quality control managers who have little or no experience using more complicated programs.

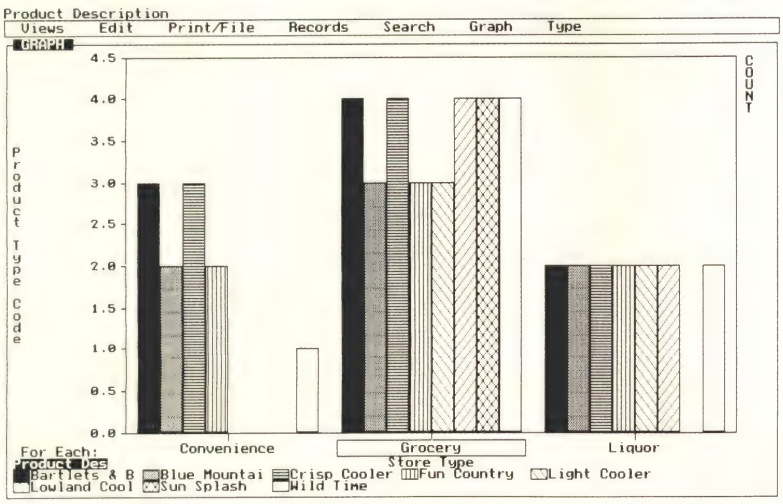
One major challenge in manufacturing is fine-tuning the production process and tracking repairs. When defective products are returned, for example, you need a detailed account of the defects to correct the production process. The *Workshop* template tracks the number of hours required to repair and test each returned item as well as the number of days between receipt of the faulty merchandise and reshipment of the repaired product to the customer. From the data you assemble, you can determine which items were produced at a given time and by which employees and how long customers took to discover the products were defective and return them. When you've concluded your analyses, you'll know the costs of inefficiency by product, person, department, and process.

Other templates in this category offer increasingly sophisticated capabilities. You can track manufacturing quality assurance by work order number, description of defect, and lot and serial numbers and examine trends among defective products to reduce the incidence of poorly produced merchandise. Finally, you can track and analyze production cost variances for each employee, product, and raw-materials supplier.

Given its broad range of applications, the *Workshop* should appeal to any small business that regularly schedules, tracks, and analyzes data and to any manager who wants quick access to analytical information. Of course, not every business will use all the templates on the *Workshop* disk. For example, the template that helps track account balance information on letters of credit is a bit esoteric for most firms. The majority of the templates, however, are geared to a general-interest audience, and Borland offers a money-back guarantee if the *Workshop* fails to perform according to the company's claims. Most significant, the *Workshop* makes using *Reflex the Analyst* even easier than before.

Stephen A. Blumenthal is an attorney in Washington, D.C., and a PC World *Contributing Editor.*

Reflex Workshop
Borland Int'l
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
408/438-8400
List price: $69.95
Requirements: Reflex the Analyst; 384K; DOS 2.00 or later version; IBM Color/Graphics Adapter, Hercules Graphics Card, or equivalent



Screen 3: This graph clarifies the relationship between product sales and type of store.

Chasing dBASE

Paperback Software sends in its low-cost dBASE clone. It's an adequate competitor, but is adequacy . . . adequate?

Richard H. Baker

In a way, the American automobile industry of the 1960s set the precedent for *VP-Info*. The formula: Take the large engine from a top-of-the-line car, soup it up, and drop it into a lightweight, low-priced model. The result was a muscle car that could outperform either of its predecessors but was Spartan and hard to maintain.

VP-Info is renegade Paperback Software's $100 muscle-car imitation of Ashton-Tate's $500-to-$700 *dBASE* line of data managers. This hot rod combines the fastest and most powerful features of Ashton-Tate's base model, *dBASE II*, and its flagship *dBASE III Plus*, but with a minimum of creature comforts. With *VP-Info*, you get *dBASE* flexibility—and *dBASE* complexity—in a low-priced data manager.

Strictly speaking, *VP-Info* is not a *dBASE* clone. It imitates the *dBASE* line in general but no single *dBASE* product in particular. *VP-Info* follows the on-screen appearance of *dBASE II* and uses *dBASE II* files and commands, then adds most of the features of *dBASE III* and *dBASE III Plus*.

This means that if you buy *VP-Info* as a low-priced *dBASE* imitator, you'll get what you'd expect. For companies wanting officewide *dBASE* compatibility at minimal cost, *VP-Info* may be just the ticket. At the same time, though, *VP-Info* follows so closely in *dBASE*'s footsteps that it scarcely makes a footprint of its own. Unlike other inexpensive *dBASE* knockoffs, such as *dBXL* and *Alpha/three*, both of which bend over backwards to accommodate inexpert users, *VP-Info* comes complete with a powerful but complicated command language and a bare-bones user interface.

The elaborate menus of *dBASE III Plus*'s Assistant interface are nowhere in sight. Neither are its many status bars and cursor navigation panels. Whatever the software equivalent of an automatic transmission might be, *VP-Info* doesn't have one.

Getting Acquainted

VP-Info's manual is, as one might expect, a paperback book with disk included. The manual is one of *VP-Info*'s best attributes, containing extensive, well-written instructions on everything from data management basics to using

Patrick McDonnell

data bases for networks. The book has a tutorial and two reference sections; one section arranges the program's commands alphabetically, and the other groups them by function. Margin notes cross-reference more detailed explanations of topics and provide useful tips and warnings.

VP-Info is copy protected, a measure Ashton-Tate dropped in 1986. Paperback Software will sell you a backup program disk for $5, and an unprotected one for $10.

Kick Start

Without the Assistant interface of *dBASE III* or *III Plus*, *dBASE* has been deservedly criticized for its skeletal user interface—a single dot prompt surrounded by acres of blank screen. *VP-Info* is just marginally better: 1> is its opening prompt. If you use more than one data file, the prompt number will change to indicate what file is currently open.

The standard data entry screen for *VP-Info* (what you see after invoking the Edit command) also has more in common with *dBASE II* than with the more elaborate *dBASE III* display. The bare-bones screens produced by such commands as List and Display will be equally familiar to *dBASE II* users.

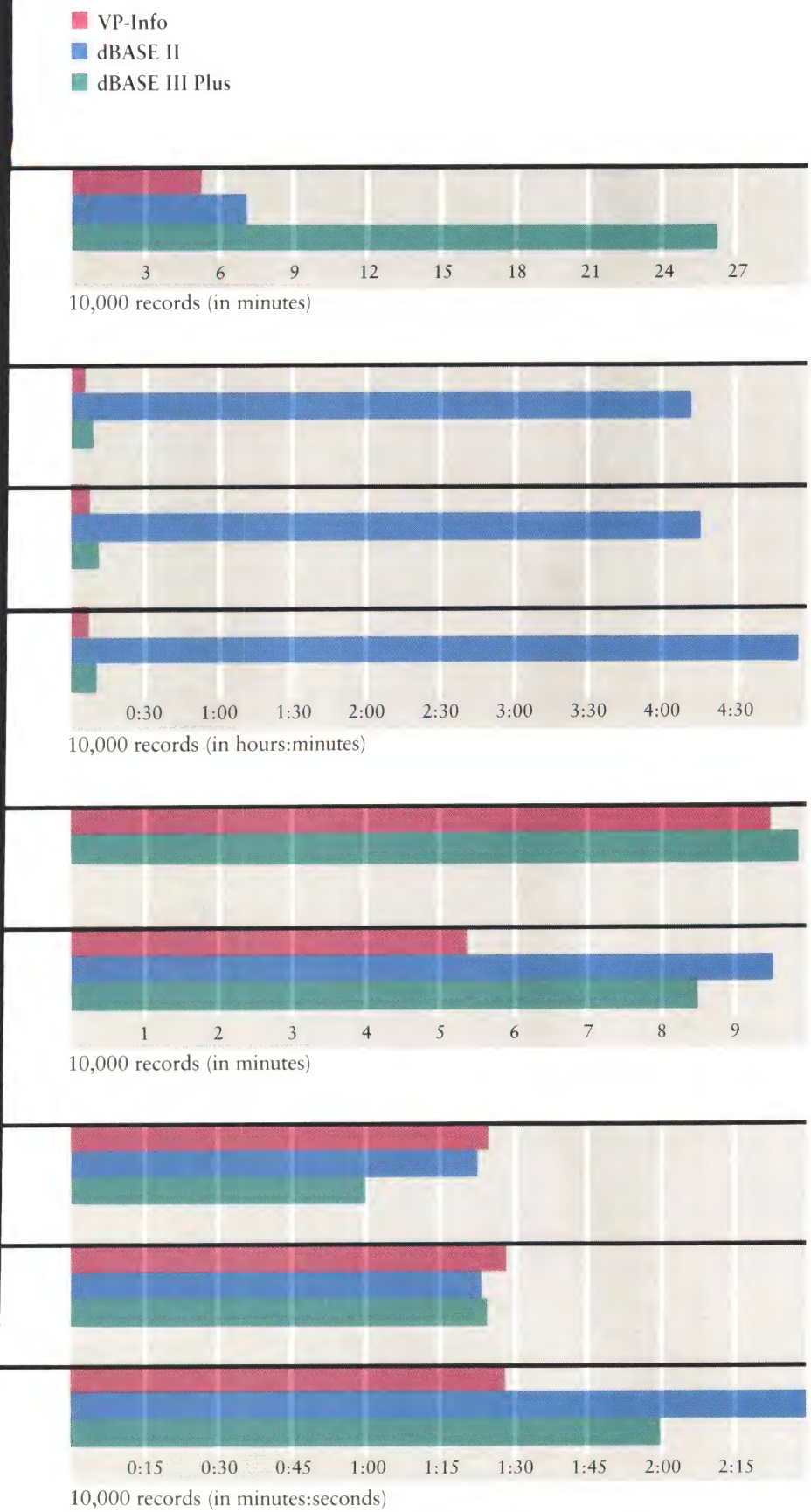
Despite its visual similarities to Ashton-Tate's offerings, *VP-Info*'s initial performance was unimpressive. The program consistently had trouble finding a *dBASE III Plus* file in another directory on the same hard disk. Under these circumstances the system occasionally hung up, requiring a reboot. Furthermore, *VP-Info*'s configuration file allows you to designate only one directory in a path. The program had no trouble, however, finding *dBASE III Plus* files on separate disks, or with *dBASE II* or *III* files.

Instead of *dBASE*'s Set Path command, *VP-Info* uses a Files command that you can invoke from a program file or from a separate configuration file. A more flexible command than Set Path, Files enables you to tell *VP-Info* that program files are in one directory, data files are in another, and so on. However, Files is hard to use. If you are working from dot commands and want to switch to a new data base application in a different directory, you must rewrite the configuration file and reboot the program. A *dBASE*-like Set Path command would be a helpful addition to *VP-Info*. In its absence, DOS 3.10's SUBST command can temporarily make a directory look like a disk, allowing you to call up files from separate directories.

Some other glitches appeared with *VP-Info*. Attempts to Set Alternate On (to save a report to a text file) produced garbled screens. *VP-Info* also is unwilling to call or be called from another program, even after you make the memory adjustments suggested by the manual.

Figure 1: VP-Info time tests were conducted on a Compaq Portable with 640K RAM and a 10MB hard disk. Like EPA mileage figures, they are for comparison only; your results with your equipment and data files will vary. Note that dBASE II cannot sort on more than one field at a time.

[1]Not applicable for dBASE II



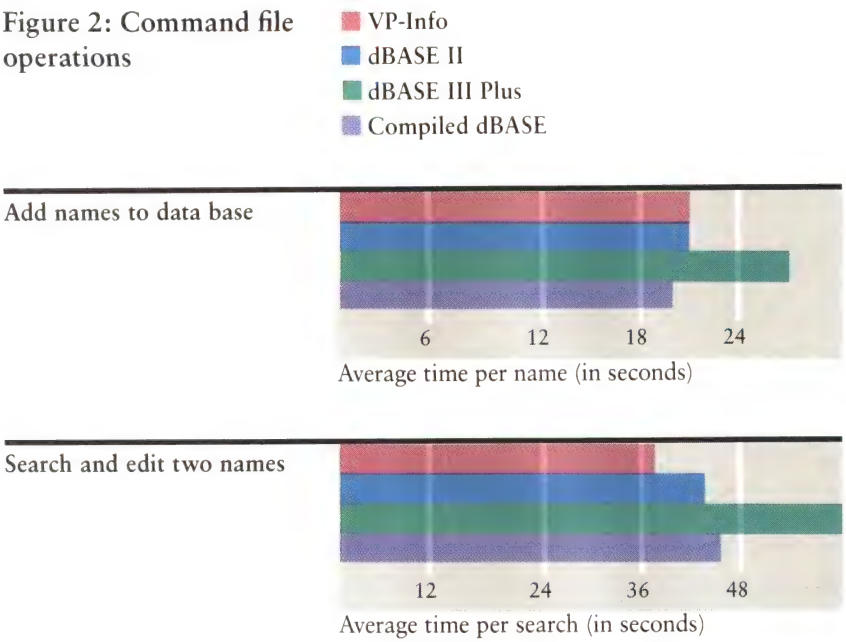
Compatibility

VP-Info's screens display the same files and records as *dBASE II*'s. That's because *VP-Info*'s language is an extension of *dBASE II*'s. *dBASE II* will load a *VP-Info* file, display it, manipulate it, and generally embrace it as one of its own. *VP-Info* will also work with *dBASE III* and *III Plus* files, as well as with its own.

VP-Info's files are also compatible with several *dBASE* add-on programs. Three programs, *Quickindex*, *Quickreport*, and *dB Report Writer* all accepted *VP-Info*'s files as *dBASE II* files and processed them without complaint. Command files (text files that store lists of commands) exhibited the same pattern: a high degree of compatibility with *dBASE II* but much less with *dBASE III* or *dBASE III Plus*. As a test, *PC World* used Fox & Geller's *Quickcode* program generator to create typical programs that would present a menu, add records to an existing data base, conduct searches, and edit existing records. (Fox & Geller's *dBASE III Plus* version of *Quickcode* was not available for this review.)

Trying to use the *dBASE III* version of *Quickcode* turned into an all-day debugging session, which was spent rooting out *VP-Info* inconsistencies. Two major problems cropped up. First, when *dBASE II* and *dBASE III* use different command names to execute the same function, *VP-Info* almost always defaults to the *dBASE II* version. Second, *VP-Info* has an inordinate number of commands that wipe out all existing memory variables. It has so many, in fact, that the manual suggests that you not bother using Release, the command that would kill the variables on purpose. Unfortunately, many

Figure 2: Command file operations



of these hired killers serve other purposes in *dBASE III*. A major example is Clear, which erases a *dBASE III* screen. In *VP-Info*, Clear wipes out memory variables and free memory, and closes all open data files. *VP-Info* instead uses Erase to refresh the screen.

In contrast, *VP-Info* graciously accepted a *dBASE II* version of the *Quickcode* file. Here, too, the program strayed from the *dBASE* path, but its variances weren't serious or hard to fix. One inconsistency is peculiar to *Quickcode*, which uses nonstandard file name extensions such as .GET and .IO. *dBASE* accepts these extensions, but *VP-Info* does not. As a result, you must rename several *Quickcode* files and correct all references to them before running them with *VP-Info*.

A second inconsistency—actually a *VP-Info* advantage—is that *VP-Info* uses a unique form of macro substitution. While *dBASE* uses macro substitution to refer to the contents of a string variable, *VP-Info* uses the same technique and an ampersand (&) to insert variables into text displays, in much the same way as a mail merge program designates variable text in a form letter. Correcting the *Quickcode* command files is simply a matter of removing the ampersands with a text editor or word processor.

As a result, you can create a mail merge letter, including text and mailing lists, from within *VP-Info*. A skilled programmer might also use text blocks and *VP-Info*'s macro substitution technique in place of *dBASE*'s @SAY and @GET commands.

Another improvement over *dBASE* commands is the Post command, useful for routine updating of a master file from a daily transaction record. When you have more than one data file open, *VP-Info* lets you direct a command to any open file, not just to the one currently in use.

The program uses a system of direct commands, written into a text file, to define a report's contents and format. While a programmer could wring more flexibility from this system than from *dBASE II*'s prompts or *dBASE III*'s and *dBASE III Plus*'s menus, novices will find the procedure intimidating. To produce a fairly simple report, you must create a relatively complex command file. This is typical of *VP-Info*'s muscle-car approach—there's plenty of power, but no power steering.

For Programmers Only

Several of *VP-Info*'s improvements on *dBASE* are directed toward programmers who write command files. As mentioned earlier, text files with macro substitutions offer a number of possibilities. Another advantage is *VP-Info*'s compiler, which is not a true compiler: You still must have *VP-Info* to run the completed program. Paperback Software explains that this is for the sake of

Executive Summary

VP-Info

Data base manager

A fast *dBASE* imitator with a rock-bottom price, *VP-Info* provides an inexpensive way to spread *dBASE* compatibility through an office. However, the program mocks *dBASE II* rather than the newer and more elaborate *dBASE III*, and it's not a mirror image of *dBASE II*: You must keep tabs on variations between *dBASE* and *VP-Info* commands.

Sorting and indexing speed	*Good*
dBASE II compatibility	*Good*
dBASE III compatibility	*Fair*
Interface	*Fair*
Overall value	*Good*

macro substitution; many compilers have trouble processing macros. In any event, *VP-Info*'s compiled programs run much faster than *dBASE*'s interpreted programs (see Figure 1).

If *VP-Info* finds a programming error while it compiles a program, you can easily make alterations. *VP-Info* will halt the program and report the error. The Write command will then take you directly to the offending program listing where you can make any necessary changes.

VP-Info can be used in networks, but not as easily as *dBASE III Plus*. Although it provides file- and record-locking commands that prevent two users from locking horns over the same data, *VP-Info* doesn't offer the extensive access control provided by *dBASE*. In all but the smallest network, however, access control is essential; with *VP-Info*, you must program user access and password routines yourself.

At the Races

VP-Info performs best in the speed contest. This souped-up data manager beats *dBASE* hands down. Table 1 shows the results of several key operations, including indexing, counting, and locating records. *VP-Info* is unquestionably faster than *dBASE II*, which gasped and wheezed when asked to sort or index large data files. (A 10,000-record file took *dBASE II* several hours to sort.) *VP-Info* is also faster than *dBASE III Plus*. Here, though, its advantage is not as significant. More important when comparing *VP-Info* to *dBASE III Plus* is the trade-off between *VP-Info*'s minimal creature comforts at $100 and *dBASE*'s powerful accessories and superior user interface at $695.

In Everyday Service

Figure 2 shows the results of some tasks you might encounter in ordinary data base use. Here, *Quickcode*-generated programs conducted familiar operations.

Using the 1986 Word Series roster of the New York Mets, *PC World* tested both uncompiled and compiled versions of two test files. The first test goes through a menu, appends a name to a data base, and returns to the program's prompt. The second test corrected a deliberate data entry error that had switched the names of first baseman Hernandez and the pitcher Fernandez.

VP-Info and *dBASE II* were noticeably snappier than *dBASE III Plus*. *VP-Info* also avoided the many time-consuming trips to the disk typical of *dBASE III Plus*. In practice, though, this made less difference than expected. One factor: *dBASE III Plus* has a useful keystroke buffer, so an experienced operator need not wait for the screen to provide a prompt.

For Whom VP-Info Tolls

VP-Info will appeal most to data base users who want a low-cost, *dBASE II*-compatible program that offers broad control and immediate response. However, they must be willing to trade comfort and convenience for power and flexibility. Despite its entry-level price, it's not a program for the novice data base user. For the office where *dBASE* is well entrenched, however, *VP-Info* is an inexpensive way to spread *dBASE* compatibility among a greater number of employees.

At the same time, though, *VP-Info* is in an odd position. Its strength is not as a challenger to Ashton-Tate's flagship *dBASE III Plus* but as an alternative to the older *dBASE II*. The question is whether the world needs a substitute for *dBASE II*. *dBASE* imitations abound, and some may offer better value for specific purposes than either *VP-Info* or *dBASE II* itself. For example, *Alpha/three* is a user-forgiving, menu-driven file manager that reads *dBASE II*, *dBASE III*, and *dBASE III Plus* data files, though not *dBASE* program files (see "Alpha/three: Simple, Powerful, Compatible," *PCW*, January 1987). WordTech's $169 *dBASE* clone claims full compatibility with *dBASE III Plus* and then adds some features on its own.

VP-Info's most serious problem is that it is an imitation. There's plenty of room for innovation within the *dBASE* standard; *VP-Info* offers high speed and a low price but little else that would endear it to users. It's a perfectly adequate substitute for *dBASE II*, but most of us expect a little more.

Richard H. Baker is author of several dBASE *books. His latest,* dBASE III Plus: Advanced Applications for Nonprogrammers, *is forthcoming from TAB books, Blue Ridge Summit, Pennsylvania.*

VP-Info
Paperback Software, Inc.
2830 9th St.
Berkeley, CA 94710
800/654-5301, 415/644-2116
List price: $99.95
Requirements: 256K, one disk drive (two recommended), DOS 2.00 or later version

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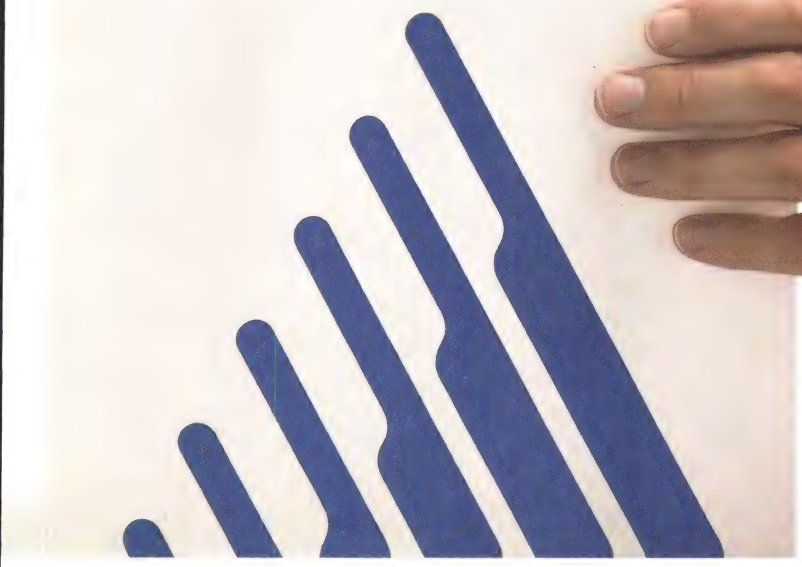

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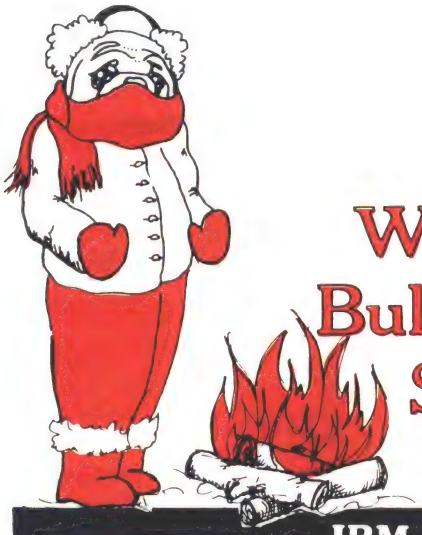

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The Soul of the 386

Endowed with boundless potential, the 80386 is already taking steps toward maturity. Goaded by a new cadre of operating system vendors, Intel's brainchild is poised on the verge of a multitasking, multiuser future.

Eric Bender and Ken Greenberg

Welcome to another generation. While this one belongs to the 80386 microprocessor, a sense of déja vù may prompt discomfiture more than reassurance. Computer users, after all, have scarcely been given the tools to exploit the 80286. The sudden storm of 386-based ATs seems like a tale told by a technologist, full of sound and fury, signifying precious little.

Fortunately, it's not.

Appearances aside, the 386 is ready to flex its formidable muscle right now. But users who want to put its strength to work need some understanding of the architectural milieu in which 386 systems are arriving.

Intel surely did not invest $100 million in 386 development to breed a clan of fast AT look-alikes. As 386-based systems come to market, it's increasingly clear that Intel made room within the 386 for interim, highly workable solutions capable of instilling even more power in power users. With an estimated $6 billion worth of 8086 applications on corporate shelves, the chip maker could hardly have done otherwise.

But Intel left it to enterprising hardware and software firms to bring its next-generation processor up to speed. Although it may be a year or two before new mainstream applications grace the 386, today's users can be cheered by the chip's support for peaceful coexistence among multiple 8086-based programs.

So while the arrival of 80386-based systems would seem to be the hardware story of the year, the real story is the clutch of fresh system software that seeks to let users have their DOS and multitasking too.

As long as IBM and Microsoft remain on the sidelines (where they were at press time), the 80386 will enjoy a predictable, even sheltered, childhood, distinguished by turbocharged, 386-based ATs, control programs that put 386 speed to good use, and proprietary systems geared to niche markets. But that's just where it starts: Ronald Fisher, president of Interactive Systems, a UNIX vendor, suggests that the 386 represents a profound break with the past. "A changing of the guard is occurring," he says. "The 386 is no longer a PC-level machine. It spans the market from micro to mini to mainframe."

What guises are the first crop of 386 systems assuming, and what are the implications of those

Scott Stedman

various designs? More to the point, what can a 386 machine help you do today, and what might it help you do tomorrow? Should you sit this generation out until it matures a bit? Or plunge right in?

A Cavalcade of Options

The 80386 will eventually transform personal computing, less by increasing throughput than by bestowing on applications a tremendous supply of addressable memory. That vast reservoir of RAM will breed new classes of applications, many of which will make use of background processing. *Framework* creator Robert Carr expects the 386 to foster "modular" 386 applications that will enable users to pick and choose from among various interfaces. Beyond this, the 386 should signal boom times for expert systems, desktop publishing, networking, CAD/CAM, simulation, transaction processing, and real-time animation.

One bellwether of the 386 era is Migent's Emerald Bay project, the handiwork of *dBASE* creator C. Wayne Ratliff. Ratliff is tuning up a 32-bit "engine" (program core) that can handle mammoth multiuser data bases. The 386 will enable the engine to support a collection of familiar interfaces, or "surfaces," that foster true data integration.

Even before a pool of such 32-bit applications exists, however, 386 machines are emerging—and taking their place in an increasingly stratified marketplace. At the market's most prosaic end are AT-compatible systems bound for early adopters. Last November's COMDEX show was hip-deep in such machines, with some two dozen vendors—from Zenith and Compaq to Mitsui and PC's Limited—displaying their wares. And 386 replacement processor boards from Intel, Quadram, and others affirmed that there's no need to forsake the installed base of ATs and XTs.

More specialized are technical 386 workstations, which need state-of-the-art graphics or mass storage hardware. The HummingBoard LISP machine, a joint effort of Gold Hill and AI Architects, exemplifies this trend. Says Eugene Wang, Gold Hill's vice president of marketing, "The 386 is the ultimate delivery machine." The AI community apparently agrees; LISP vendors Lucid and Franz, along with Prolog supplier Arity, were among the first software houses to steer development toward the 386.

The majority of 386 graphics and AI workstations will feature proprietary implementations—large screens, voluminous disk storage capacity, and very high-speed bus-to-peripheral connections.

Corvus, Novell, Kaypro, and TeleVideo are among the first out with 386-based local area network (LAN) servers; all couple processor speed with roomy, extremely fast hard disks. Novell's file server reportedly boasts a 1000-user capacity, fault tolerance, and an updated version of Netware. Of course, as 3Com president William Krause points out, nets don't live by MIPS (millions of instructions per second) alone: "A superchip does not make a server; a server is designed to optimize movement of data, not processing."

'We now get to capitalize on the gap between the 8088/8086 and the 386, not the gap between the 286 and the 386.'

Whether 386 machines thrive as multiuser vehicles remains an open question that a handful of vendors are working hard to answer. Venerable Altos has reportedly developed a system capable of supporting 40 users. And straightforward multiuser machines may be only the beginning. Lance Hansche, vice chairman of Phoenix Technologies, has had a peek at a prototype 386 multiprocessor machine that packs up to six processors within a single chassis. Rexon, another multiuser house, has beefed up its 286 line with multiple 386 coprocessors.

With the 386 already acting in a panoply of roles, the new CPU has nothing if not an open future. As Ashton-Tate president Ed Esber says bluntly, "We now get to capitalize on the gap between the 8088/8086 and the 386, not the gap between the 286 and the 386."

A Chip to Play in New Games

"The 386 is very difficult to describe because it brings so much to the PC," says Microsoft chairman Bill Gates.

Intel's flagship 32-bit processor can crunch through more than 3 million instructions per second, directly accessing 4 gigabytes of physical address space and 64 terabytes (that's more than 70 trillion bytes) of virtual address space. The chip's pipelined architecture results in lightning-fast memory access times, while on-board memory management circuitry protects tasks from each other, thereby enabling multiple operating systems to coexist oblivious to one another. The 386 likewise can simultaneously run 8086, 80286, and 80386 software (see the sidebar "Star Memories").

Overall, the 386 is a mainframelike engine on a square centimeter of silicon. You can quibble that it doesn't provide sufficient support for high-speed I/O to rank as a mainframe, but with auxiliary circuitry it handles the job nicely (for an overview of the 386, see "80386: The Megabyte Manager," *PCW*, February 1986).

The 386 offers a cleaner slate than do earlier Intel microprocessors. "The 8086 is limited, and the 80286 is defective and incompatible in protected mode," notes Gerald Popek, president of UNIX supplier Locus Computing. "The 386 is a correction of the 286's faults—fast, clean, easy to build applications for. It's everything the 68000 series was, but it brings a host of applications to the party."

Software à la Mode

The 386 runs in two modes: real and protected. In real mode, the processor emulates the 8088/8086, executing existing software at greater speeds; but it still handles only one task at a time and confines its activities to the 8088/8086's 1MB address space. With a few notable exceptions, the current crop of "386 ATs" hew to this scheme.

Protected mode—the formal name is protected virtual address mode—unleashes the 386. In this mode, the chip can attain its full address space and support "virtual 8086 machines" running simultaneously, while fancy memory-management hardware tidies up the laundry. According to Dana Krelle, Intel's 80386 marketing manager, tasks are "protected from each other by architectural fire walls in the processor. Full energy is delivered to all tasks."

Nonetheless, some caveats apply: While the 386 can run multiple 8086 applications in virtual 8086 sessions simultaneously, problems crop up with programs written to exploit specific portions of PC hardware, such as the screen. Here, a 386-specific operating system must trap 8086 hardware calls, and that causes a perceptible slump in performance.

Intel's flagship 32-bit processor can crunch through more than 3 million instructions per second, directly accessing 4 gigabytes of physical address space and 64 terabytes of virtual address space.

The operating system—or some intermediary between the operating system and the machine—can bring DOS applications to heel with a piece of software called a virtual monitor. The virtual monitor intervenes when an application makes a system or an I/O call, and it traps those calls when necessary. Multiple applications can simultaneously write to what they believe to be the screen; the operating system or intermediary then decides what is actually displayed. Single-user, single-tasking applications can thus run without clashes in a multiuser, multitasking environment.

Software written for the 286's protected mode will also run on the 386, with a couple of big ifs—if the 386 runs the 286 operating system, or if a 386 operating system is capable of trapping (and supporting) 286 applications' system calls. The uneasiness that developers feel about these wrinkles is partly responsible for the dearth of 286-specific applications. And rumors persist of a hardware flaw in early versions of the 386 that torpedoes 286 protected-mode software.

Star Memories

Systems based on the 386 are arriving at a time when many components are in transition. One is internal memory, where 1-megabit chips are starting to supplant 256K-bit chips. The later a 386 system vendor enters the market, the more likely its machine will include 1-megabit chips.

"It's still somewhat of a design risk to commit to 1-megabit chips in systems coming out in the first quarter," Phoenix Technologies vice chairman Lance Hansche suggests. But as 1-megabit chips become available in volume and costs drop below those of 256K-bit chips, the choice becomes obvious.

Designers face much more difficult choices among memory architectures. According to Intel's Dana Krelle, these divide into four main methods: employing traditional RAM architecture, interleaving RAM, using static-column RAM, and implementing a cache scheme. The traditional approach to RAM is straightforward and costs relatively little, but it doesn't do the system any favors in the speed department.

Interleaving takes advantage of the 386's pipelined design, performing different steps (fetching, decoding, execution, memory management, and bus access functions) simultaneously.

"To enhance performance by interleaving means dynamically switching—every access goes to alternating banks of memory," Krelle explains. This method hides cycles on the bus from the processor; it might take three clock cycles to access memory, for example, but the processor sees it as two clocks.

For 32-bit operation, however, this tack requires that memory be 64 bits wide. That means that a system built with 256K-bit chips must have a minimum of 2MB of memory (because you need 64 chips); 8MB is thus the base system you can ship with 1-megabit chips. Says Compaq vice president Gary Stimac, "It's kind of a clumsy architecture."

Compaq opted for static-column RAM chips—new designs entering production just in time for the Deskpro 386 and well suited for high-speed paged access. During consecutive operations within a page of static-column memory, the row address is kept constant while the column address is modified. This procedure cuts the usual 100-nanosecond access time in half. Compaq's memory system sets up 2K pages; typically, about 60 percent of memory calls are made in paged mode, and the memory averages 0.8 wait state per access.

Caching, on the other hand, involves storing frequently used code and data in extremely high-speed (and more costly) RAM. (A cache is simply a buffer between standard RAM and the system.) Krelle notes that numerous cache options exist, the quickest of which can offer 0.3 wait-state performance.

Compaq's findings belie the notion that esoteric architectures ensure higher throughput; other than simply plunking conventional RAM on the bus, these methods provide comparable performance running standard PC applications. *—E. B.*

Despite the promise of continued compatibility with its 16-bit Intel predecessors, the 386 has thrown a monkey wrench into the "natural" evolution of PC operating systems. Says Jim Johnson, co-manager of Intel's Personal Computer Enhancement Operation, "The 386 includes features that demand a new operating system."

So what operating system is that? In the PC world, that's the joker: There's no IBM-sanctioned operating system that delivers a smooth upgrade path for existing DOS applications, and Microsoft is intimating that a seamless transition may not be possible at all.

Whither DOS?

With no mature alternative in the hands of software developers, DOS 3.*xx* wins by default as the 386's dominant operating system—for now, at least.

While Microsoft has been on the hustings for *Windows* to point the way toward the DOS of tomorrow, the firm is tight-lipped about the precise steps that lead to that future.

Beyond that, Adrian King, Microsoft's director of operating system software, acknowledges only that the firm is continuing work to exploit both the 286 and the 386. That translates into a commitment to provide "proper multitasking," banish the 640K barrier from future applications, and move selected *Windows* functions into DOS.

Under DOS 3.*xx*, 386-based systems experience two to three times the throughput of 286 machines, thanks to greater clock speed, quicker memory access, and the sheer efficiency of processing data 32 bits at a time. DOS 4.00, which lacks IBM's imprimatur and will likely spend its life in Europe, is a single-user, multitasking system. Says King, "[DOS] 4.00 is very much targeted toward LANs and communications—it's not really a general-purpose update."

DOS 5.00—the so-called Advanced or Protected Mode DOS—is expected to give applications entrée to the 286's 16MB of directly addressable RAM. Later still, DOS 6.00 will open wide the 386's memory gates (see Figures 1 and 2). Phoenix chairman Neil

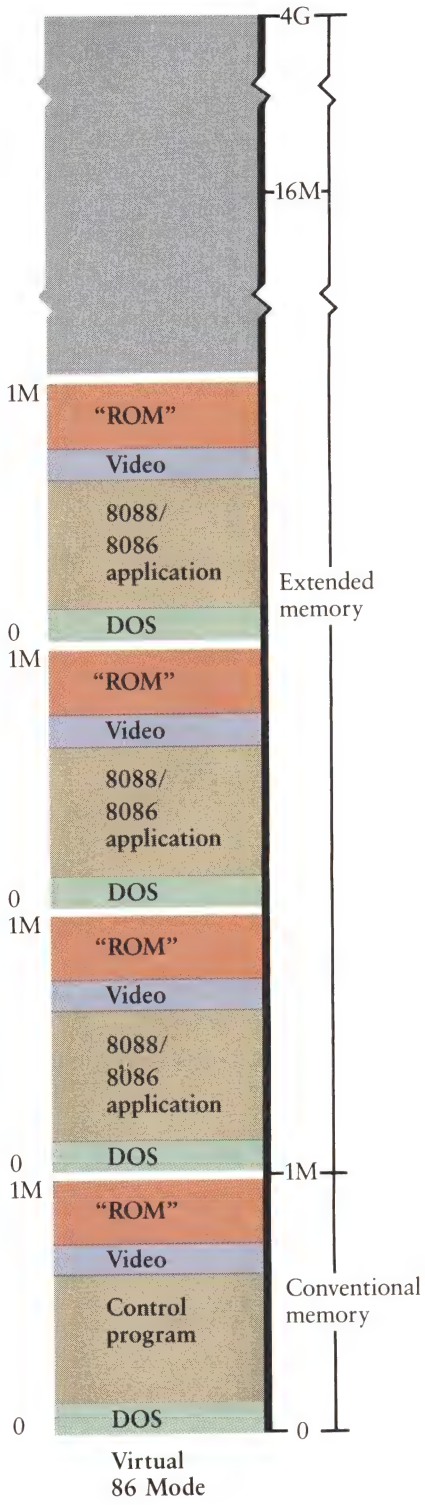


Figure 1: Under the 386's Virtual 86 mode, each 8086 application is allotted a full 1MB in extended memory. Control software shares low memory with 8086 code.

Colvin is among those who see in the various flavors of DOS the specter of incompatibility: "Both 5.00 and 6.00 are new environments . . . not the [current] DOS environment. Will people support all three?"

Despite the promise of continued compatibility with its 16-bit Intel predecessors, the 386 has thrown a monkey wrench into the 'natural' evolution of PC operating systems.

The other fish Microsoft has to fry is Xenix System V/386, due for release this quarter. "Our initial thrust is totally behind Xenix," says King. "When it comes to exploiting the 386, Xenix is clearly more technologically advanced than DOS." Xenix makes excellent use of the 386's linear addressing—and for a multiuser operating system, that's a definite advantage over the 286's segmented addressing, King notes.

Promises, Promises

Because the operating system gatekeeper still hasn't delivered a DOS-like system tailored for the 80286, let alone for the 386, the noise and confusion persist. At least for the moment, an opportunity may exist for new horses to join the system software derby. Indeed, because the capacious 386 work space tolerates concurrent operating systems, established vendors who are new to the DOS world regard the 386 as an inroad to the lucrative PC marketplace.

Brandishing "control software," UNIX suppliers are teaming up with DOS-compatibility houses; purveyors of operating system extensions are releasing 386 extensions; and a few firms are even working from scratch, hoping that fate may smile on them while Microsoft remains busy cooking up the definitive DOS. Microsoft itself is even cozying up to one DOS/UNIX hybrid (see the sidebar "Control Software in Control").

But the perception of arrested development at Microsoft isn't the whole story. There's a growing consensus that with the 386, the industry and its customers have reached the Rubicon; crossing it now needs only an appropriate operating system. Says Interactive Systems' Ron Fisher, "The power of the 386 has forced a rethinking of operating system strategy. Once, there was no question DOS would be the development environment. Now, it's not clear DOS is the answer."

Interactive Systems and firms like it complement those hardware vendors who've taken to building supercharged ATs; all emphasize a safe, "solutions now" approach. All maintain that their systems—when released—will be fully DOS 3.*xx* compatible, entail little or no performance penalty, accept off-the-shelf 8086 software, and (via virtual monitor software) run multiple applications simultaneously.

Hard Choices

Even in the absence of clear operating system signals, intrepid hardware vendors are forging ahead with 386-based systems.

With a corner of the marketplace devoted to multi-386 designs and other exotica, mainstream 386 systems are apt to pivot on the issue of speed. There, the starting design consideration is the chip's clock speed.

"People are trying to design for 20 MHz, and aggressive developers want to design for 24 MHz," says Phoenix's Hansche. But problems with support chips arise at well below those speeds. Gary Stimac, Compaq's vice president of engineering, suggests that 16-MHz designs have already pushed conventional PC hardware to its limits; the next step is into a realm of hardware logic inhabited by mainframes and military electronics.

Along with 386 systems come a raft of plug-in boards that promise processing at breakneck speeds. These divide into replacement processor boards (which connect by cable into the socket left vacant by the removal of the 286) and coprocessor designs.

Most of the 386 boards work solely with ATs; Quadram has taken a different tack with a model for the XT. The bulk of the 386 boards pack ample RAM for 32-bit memory access, but some—like Intel's—compensate for slower, cheaper RAM with caching (for a description of caching, see the sidebar "Star Memories"). Collectively, sales of such plug-in options may outstrip those of their 286-based predecessors.

Lacking an IBM standard, the "pre-clones" have taken various bus routes. Compaq combined its own 32-bit memory bus—populated with high-speed RAM—with 8-bit and 16-bit buses for everything else. Zenith, by contrast, has stretched six of its machine's eight slots to 32-bit—but all six accept 8-bit and 16-bit boards; in keeping with company tradition, Zenith has even separated the CPU from system memory. In the main, however, vendors are restricting their 32-bit slots to RAM alone and have opted not to touch other channels.

For now, anyway, "The only thing that needs the speed of the 32-bit bus is RAM," Compaq president Rod Canion insists. Storage access is limited by disk-controller speed, and communications requirements are easily handled by existing 8-bit buses. Although graphics would benefit from 32-bit access to the outside world, the imminent arrival of graphics coprocessors tempers that imperative.

Impatient for IBM's 386 bus, Phoenix last spring kicked off an informal effort to develop a 32-bit industry standard; the bid evolved into the Personal Computer Extended Technology (PCET) standards committee and generated proposals that seem destined to become IEEE mandates. By October PCET had nailed down a proposed standard AT-compatible bus with a 32-bit extension for memory and peripherals—a sufficient target for hardware designers, Hansche says.

In the short run, it's a virtual certainty that confusion will continue to prevail over consensus. In releasing its Premium/286 system, AST Research—which built an expansion board empire around the PC bus—quietly introduced its own 32-bit extension to the machine's AT-compatible 16-bit bus.

Figure 2: Protected-mode DOS would open the 286's 16MB of address space to the 386 but would not unlock the 386's vast acreage of RAM. Note the two CPUs' kinship in addressing below 16MB.

Control Software in Control

The 386 hills are alive with upstart operating systems, control programs, and other interlopers on Microsoft's traditional turf.

A control program simply performs the housekeeping necessary for 8086 applications to live safely on many virtual machines. One day, every 386-specific operating system will include a control software component. In the meantime, these budding solutions vary in both their appetite for memory and their maturity.

A thumbnail guide to a handful of this generation's up-and-coming vendors follows:

VM/386. As the market for copy protection dwindles, the veteran locksmiths at Softguard Systems are carving a new niche in the 386 world. The firm's VM/386, patterned after IBM's VM/370, is, in the company's words, "expressly designed to provide a host environment for other operating systems." Softguard's control program—which the firm dubs "the operating system hotel"—sits between the 386 and a series of virtual 8086 machines (see Figure A).

Under VM/386, the foreground task gets dibs on the screen and the keyboard; background tasks write to virtual monitors, thus enabling applications like *1-2-3*—which writes directly to the screen—to operate in a multitasking environment.

VM/386 treats the 386 as a flat 4-gigabyte address space; the memory map sprawls across that entire realm of virtual memory. Regions are set aside for 8086 applications, extended memory, expanded memory, bank-switching for EGA routines, 32-bit native applications, and MVM/386 (an eight-user variant of the operating system). In addition, a full gigabyte is reserved for intermachine communications, enabling users to cut and paste data between applications running in separate virtual machines (see Figure B).

VP/ix. A collaborative effort of Interactive Systems and Phoenix Technologies, VP/ix (virtual PC under UNIX) is based on UNIX System V release 3. Ron Fisher, Interactive CEO, calls VP/ix "a bridge product" that is apt to live as long as the 8086-based applications it supports.

VP/ix is what you get when you cross Phoenix's DOS emulation skills with Interactive's version of UNIX. The resulting system permits multiple DOS applications to run under UNIX or Xenix 386 in a multiuser, multitasking environment. Interactive added 50K to the UNIX kernel and developed a "virtual terminal" interface, from which you can hot key between workstations. VP/ix also permits data sharing between UNIX applications and DOS programs.

Although VP/ix itself treads lightly in the overhead department, you'll need to load DOS, the UNIX

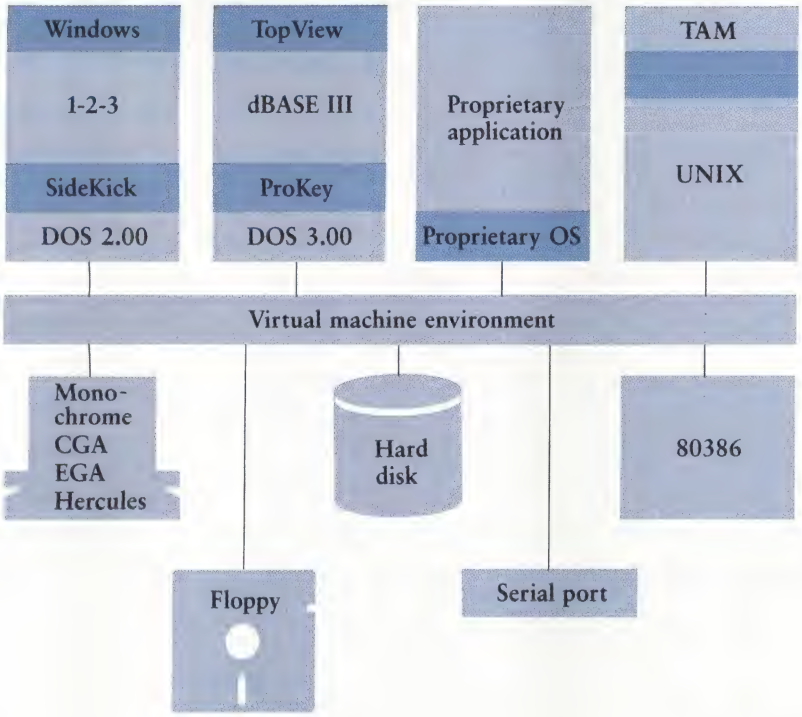


Figure A: Under Softguard Systems' VM/386, each virtual machine has its own operating system and active application. Each acts as though it had hegemony over the CPU.

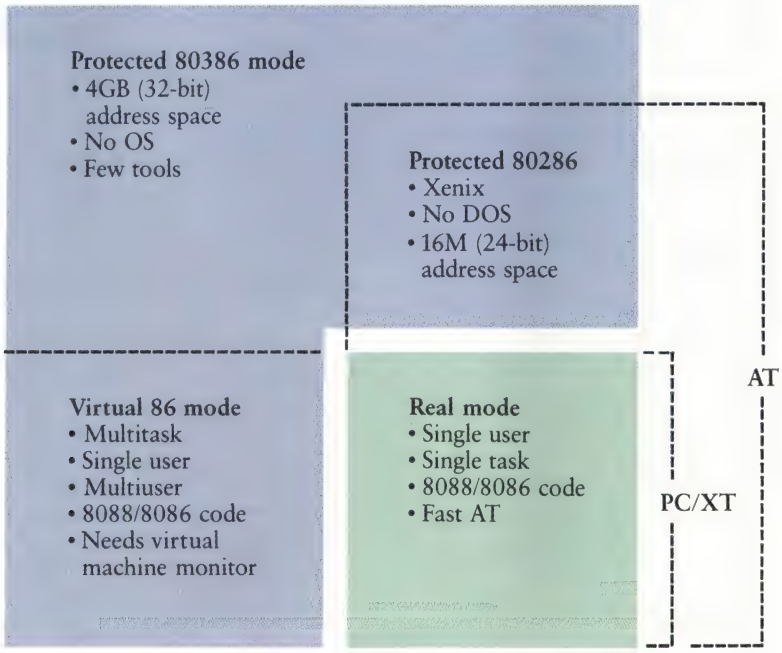


Figure B: In this Softguard Systems rendering of 80386 operating modes the 386 is bisected into real and protected modes; the latter is further split for virtual 86, native 286, and native 386 applications.

kernel, and then VP/ix—plus programs and data. Not surprisingly, the bidding on memory for a system running VP/ix starts at 2MB.

Interactive is wooing veteran UNIX partisans in the minicomputer and engineering realms. Curiously enough, the approach also got a nod from Microsoft, which has asked Phoenix to develop a version that runs under Xenix.

Merge 386. Locus Computing has built on *SimulTask,* an earlier offering that enables AT&T's 6300 Plus to run DOS as a task under UNIX. Unlike its 286-based predecessor, *Merge 386* executes multiple concurrent DOS applications and requires no special hardware. Says Locus president Gerald Popek, "*Merge 386* smells, tastes, and acts like DOS. But it's more capable because it has UNIX communication facilities under the covers."

Distilled to its essence, *Merge 386* intercepts a DOS 3.*xx* application's system call, converts it to UNIX, and issues an equivalent UNIX call. While this would seem to place a burden on the 386, Locus says that precisely the opposite is true. Popek maintains that because *Merge 386* employs its own caching scheme, some programs actually pick up speed. *Merge 386* swells the UNIX kernel by about 70K and is subject to the same RAM prerequisites as VP/ix. Locus has also incorporated (and reportedly enhanced) Award Software's AT-compatible BIOS routines.

PC-MOS/386. The first from-the-ground-up DOS-compatible 386 operating system hails from The Software Link (TSL), an Atlanta firm whose forte is shared processing. "We're not reverse-engineering DOS or taking it apart—we simply want to support what the application developers know about the operating system," says president Rod Roark. Alone among the systems described here, PC-MOS replaces DOS—which may well be why TSL has the toughest row to hoe.

The company is building memory management, security, print spooling, and intertask communication capabilities into PC-MOS/386. It is designed to intercept applications that write directly to video RAM, acting as a referee for users running multiple tasks or users working at remote terminals.

By the time TSL applies the finishing touches, PC-MOS/386 will enable users to run multiple applications simultaneously in both virtual 86 and 32-bit native protected modes. The firm is preparing single-user, 5-user, and 25-user versions.

CTOS/VM. At arm's length from generic, DOS-oriented offerings is Convergent Technologies' proprietary CTOS/VM—a multiuser 386 operating system that debuted with Convergent's Series 386 NGEN last fall. Still, the company has cleared ample room for DOS; CTOS/VM sports a Context Manager that enables users

to flip between as many as ten virtual 8086 machines, running alongside CTOS applications. CTOS/VM, a purely OEM product, is most likely to show up on Convergent systems that wear the Unisys label.

Desqview 1.3. Quarterdeck Office Systems was the first to actually hit the streets with a control program, releasing a *Desqview* tailored to the Compaq Deskpro 386. Version 1.3 supersedes all previous releases of the product but doesn't support virtual 86 machines unless you've got Compaq's 386 or ALR's Access 386 on your desk. Last December Quarterdeck began bundling the product with ALR's 386 system and tossed in its own version of the Compaq Extended Memory Manager (CEMM).

Like the CEMM driver with which it converses, *Desqview* uses the 386's internal memory-management circuitry to beat back the 640K workspace barrier. And because *Desqview* adheres to AST's Enhanced Expanded Memory Specification, program code for each virtual 86 application can live in memory above 640K. Version 1.3 supports nine concurrent applications, an admittedly arbitrary restriction that Quarterdeck vows to remove in its next release.

"We think expanded memory reduces the [memory] limitations of virtual 86 mode and thus redefines that mode," says Quarterdeck's Gary Pope. The result, he suggests, is an ability to run larger programs, supply them with more memory, and execute them more quickly than you could with an expanded memory board.

Quarterdeck is adamant that offerings like CEMM and *Desqview 1.3* have transformed what had been a stopgap solution into a de facto standard. Adds Pope, "There's no reason to look down on practical, incremental solutions—that's how things get done." *—K. G.*

Desqview 1.3
Quarterdeck Office Systems
150 Pico Blvd.
Santa Monica, CA 90405
213/392-9851
List price: $99.95
Requirements: Deskpro 386 or Access 386, 256K, two disk drives, DOS 2.00 or later version
Not copy protected

PC-MOS/386
The Software Link
8601 Dunwoody Pl. NE #632
Atlanta, GA 30338
404/998-0700
List price: PC-MOS/386 MT $195, PC-MOS/386 Multiuser-5 $595, PC-MOS/386 Multiuser-25 $995

Once in a Blue Move

Although the 386 market promises many surprises, IBM's entry should provide the most drama. At press time, Big Blue was offering few hints about its intentions, and industry scuttlebutt is that its products won't ship until the second half of this year.

While IBM is clearly working hard on 386 systems, it also wants to protect its large investment in PC software—to say nothing of sheltering other offerings (like the System/36) that can't compete on price/performance considerations alone.

'The 80386 will allow the marriage of MIS and personal environments.'

Just as clearly, IBM had good reason for signing a joint development agreement with Intel—the payoffs being components that support the 386 as well as other CPUs. In a more speculative area, IBM can build its own proprietary version of the 32-bit processor, but what extra value would justify the huge investment?

Rumor has it that IBM will offer its large corporate clients 386 machines with Systems Network Architecture (SNA) communications facilities burned into ROM chips. Certainly, a host of other approaches that capitalize on proprietary technology is possible.

Others expect the 386 to turn up as a coprocessor on existing IBM multiuser systems. Michael Goulde, an analyst with the Yankee Group, thinks IBM's new 9370 low-end mainframe makes a good target. Running under IBM's Virtual Machine operating system, "The 9370 recognizes a coprocessor as another task, so there's no problem at all doing that," he says. Such an offering could provide a powerful combination of mainframe and PC software.

Hansche suggests a merger of the 386 and the System/36, taking advantage of the large base of System/36 software. "I don't think IBM can establish a software barrier unless they bring along software they already have," he says.

Complicated Choices

In this unsettled environment, when will buying a 386 make sense—especially for general office applications?

Today's pricing obviously prohibits buying the new-wave systems for occasional word processing and the like, but single-user configurations aren't priced all that far above AT stickers. Indeed, with a fresh blast from the Far East, last fall's COMDEX featured a score of full-blown systems at commodity prices. Boards bearing naked 386 chips debuted for as little as $400, although such price tags have caveat emptor written all over them.

But whatever its ostensible price, a 386 system is hardly a commodity; the chip is simply too new and its potential too vast to fit that rubric. It's no surprise then that neither users nor software vendors are rushing pell-mell to the 386. Microsoft's Adrian King notes that developers are understandably reluctant to walk away from the large installed base of AT-class machines: "The 286 will be the corporate standard for two to four years at least." With PC applications that truly exploit both architectures a year or two away, some software houses will go straight to the 386.

In broader terms, some see the 386 as taking a historic step for desktop computing—away from bit-fiddling and into an era that promises both power and peaceful coexistence, with virtual machines running happily side by side.

"We find it wildly exciting," Hansche says. "The virtual environment allows people to effectively build machines that are not PCs but that can run PC software. Now you can do all sorts of weird stuff and still remain compatible."

PC compatibility, however, is not a given. "People now assume compatibility is easy," notes Compaq's Rod Canion. "We think the 386 will change that. So many compatibility issues go far beyond the ROM BIOS or the chip itself."

"With the 386, you immediately get into all sorts of strange timing problems," Microsoft's King says. One example is copy protection schemes, which blow up at 16 MHz. Compaq finessed such quirks with a BIOS smart enough to slow down for copy protection checks, but that kind of programming ingenuity can't be assumed of every clone maker. Many firms "copy a motherboard, put in a fast crystal, and pray," says Dave Springer of NDR Engineering, designer of American Computer's 386 Turbo accelerator board.

For the truly PC-compatible, however, the lure of the 386 is simply a long and lively future. As the 386 era dawns, software vendors are dreaming big.

Says Gerald Popek of Locus, "Programs will make better use of hardware-intensive shortcuts. Real-time animation will enrich the user interface." Microrim president Kent Johnson suggests that even more far-reaching developments are afoot. "The 80386 will allow the marriage of MIS and personal environments," he says. "Million-row data bases will be common; graphics and images will be stored in data bases. LANs will be easy to install and will be transaction-based. Think of it—applications will be able to support multiple interfaces." *dBASE* creator Wayne Ratliff hails the advent of true "data-level" integration. And the list of dreams goes on . . .

So the next generation of users may not trust any computer under 32-bit.

Eric Bender is the East Coast Editor and Ken Greenberg the Southwest Editor for PC World.

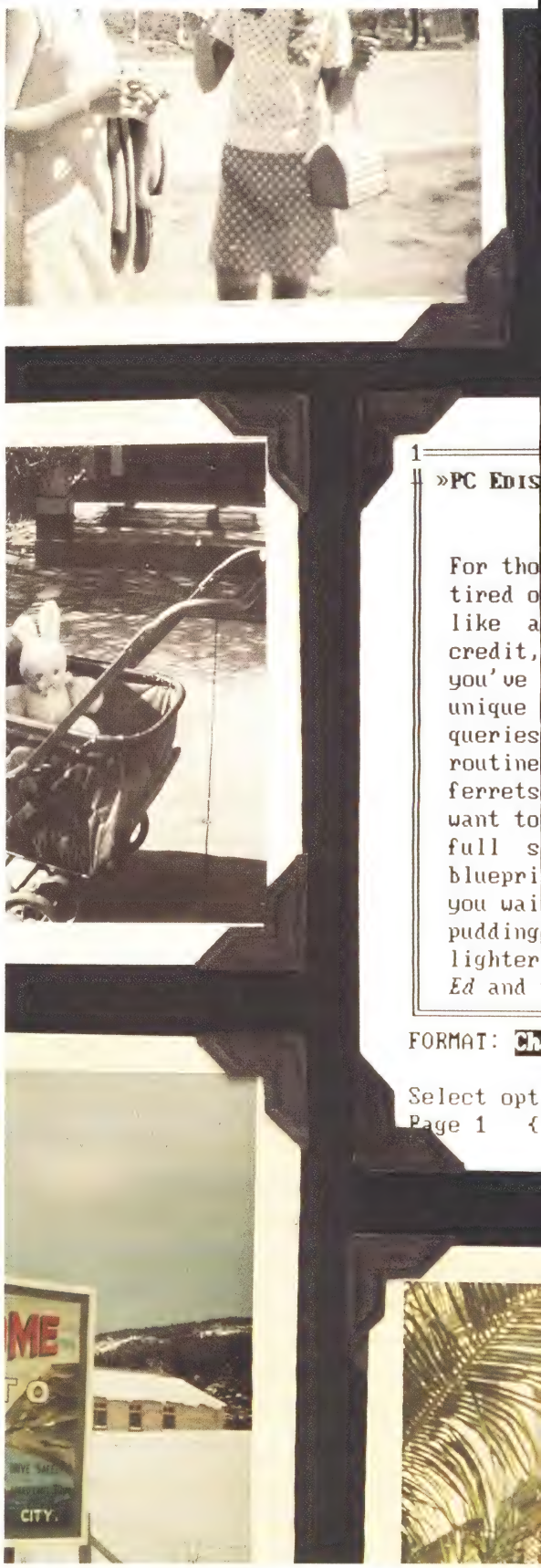
Access 386
Advanced Logic Research
10 Chrysler
Irvine, CA 92718
714/581-6770
List price: basic system with 512K and one floppy disk drive $3990; enhanced monochrome system with 1MB, 30MB hard disk drive, ALR Challenger multifunction board, and monochrome monitor $5890; enhanced color system with 2.5MB, 30MB hard disk drive, ALR EGA board, and 14-inch EGA monitor $6949

Deskpro 386
Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
713/370-0670
List price: Model 40 with 1MB and 40MB hard disk drive $6499; Model 130 with 1MB and 130MB hard disk drive $8799

Inboard 386/AT
Intel Corp.
Personal Computer Enhancement Operation
5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124-6497
503/629-7354
List price: $1995, with 1MB $2245
Requirements: PC AT or compatible

Quad386XT
Quadram Corp.
One Quad Way
Norcross, GA 30093-2919
404/923-6666
List price: $1500 at press time
Requirements: PC XT or compatible

Print That Screen!



Rolling sharp screen images out of your LaserJet or LaserJet Plus doesn't require a photographic memory for obtuse commands. With this compendium of useful tips, tricks, and utility programs, you can take better screen snapshots in a flash.

Ted Nace

For millions of PC users, pressing <Shift>-<PrtSc> is the quickest route from screen to printer. Using this humble function doesn't require sitting through a training seminar or interacting with an oppressively user-friendly disk tutorial. If you can press these two keys at the same time, you can take a snapshot of your screen and print the result.

A print screen (or screen capture, as it's often called) can serve many purposes. You might use a screen capture to print out a paragraph or a graphic for quick reference; capture a page of electronic mail; or with the appropriate high-resolution display and printer, plunk an on-screen image onto paper for a report, manual, or presentation. If nothing else, a print screen can replace an application's printing function if the necessary printer driver is not installed or if a program lacks a LaserJet driver altogether.

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natural language
tificial intelligence
e program quickly
at it is that you
, and then produces a
specifications and
your plotter while
the proof is in the
ilt and tested two
ir craft designed by
atched them against

Outline - PC Edison

I. Program Overview
II. What Makes Edison Tick
III. Back Off Scoffers!
IV. Tests on Aircraft
V. Tests on Little Gismos
VI. Tests on Toys
VII. Conclusion: A Genius!
◆

Paragraph Tabs Footnote Division Running-head Style

type command letter

EX Microsoft Word: DUMPIX4.DOC

Mark Earbin

Short of typesetting, the sharpest screen capture images are produced on a laser printer such as a Hewlett-Packard LaserJet. Using the techniques and utilities described in this article, you can produce snake's-tooth-sharp printed screens on the LaserJet from virtually any kind of monitor. Depending on the software, you can also change the aspect ratio, size, resolution, and orientation of a captured image; crop it to fit; and add special effects such as inverse video. With some programs you can even capture a screen to a special disk file and print it out on another system that's connected to a LaserJet.

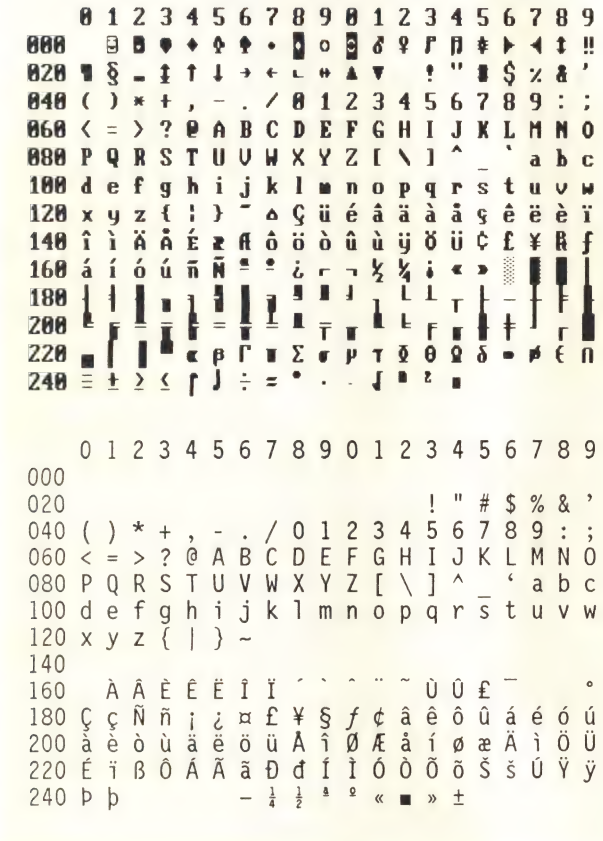


Figure 1: A comparison of the character sets used by the IBM Monochrome Display Adapter (top) and the HP LaserJet (bottom). Although both use the same keyboard characters, graphics characters (ASCII 127 to 256) are decidedly different.

In the Mode

Before you transmit a screen to the printer, you must identify the mode of your system's display board—the circuit board that controls the monitor. As Table 1 shows, the method employed for printing an image depends on how your screen displays graphics and text. There are four major display standards: the IBM Monochrome Display Adapter (MDA), the Hercules Graphics Card, the IBM Color/Graphics Adapter (CGA), and the IBM Enhanced Graphics Adapter (EGA). (For more on character and graphics modes, see "Display Intelligence," *PCW,* February 1987.) Many video boards emulate two or more of these display standards. For example, IBM's EGA mimics the IBM MDA and CGA; some EGA clones also emulate the Hercules, Plantronics, and other standards (see "Seven Up on EGA," *PCW,* August 1986). Because some boards offer a number of modes, match the technique or utility to the correct mode.

Before exploring the applications and merits of these various techniques, you might well ask, Are they really necessary? What's wrong with simply pressing <Shift>-<PrtSc>?

Indeed, if the familiar <Shift>-<PrtSc> key combination worked with all display modes and the LaserJet, this article would be unnecessary. But the <Shift>-<PrtSc> command—one of the many essential routines in the PC's BIOS ROM chip—was designed to handle only character-based screens. Note, too, that almost all of the LaserJet's internal, cartridge, and downloadable fonts do not match the character sets used by most display adapters (see Figure 1). If you attempt <Shift>-<PrtSc> with the LaserJet, you'll discover that keyboard characters translate correctly, but that graphics and foreign language characters—which are used for borders, boxes, and shading by *WordStar, dBASE,* and other character-based programs—do not.

The unaided LaserJet is not particularly adept at capturing and printing bit-mapped graphics screens, either. If you need a quick shot of a *ChartMaster* graphic or a page produced with *Ventura Publisher* sporting multiple typefaces and type sizes, pressing <Shift>-<PrtSc> will produce a blank sheet of paper or computer jabber. With the variety of display adapters and video modes on the market, it's a challenge to find a screen-capture method that works—and provides an acceptable combination of output quality, price, speed, and image manipulation tools.

Table 1: Comparison of screen-capture methods (red dots = best methods)

	<Shift>-<PrtSc>	Font 10	Print Screen	92286Y	Grafplus	Hotshot	Inset
Mode							
MDA	●	●		●	●	●	
CGA			●		●		●
Hercules			●		●		●
EGA					●		
Printer							
LaserJet			●	●	●		●
LaserJet Plus		●	●	●	●	●	●
Features							
Inverse video					●	●	●
Adjust aspect ratio					●		
Multiple sizes					●	●	●
Cropping					●	●	●
Change orientation					●	●	●
Print to file					●	●	●
Integrate with text						●	●
Price	free	free	free	$330	$49.95	$99.95	$149

Judging the Options

As Table 1 shows, there are many screen-printing techniques and programs. Which is the fastest? The cheapest? Which gives the greatest flexibility in altering the appearance of the screen? Most important, which produces the sharpest output?

Speed. While speed might not initially be on your list of critical features, you'll find that it's an issue if you take a lot of screen shots. If the LaserJet is connected to a parallel port, printing a screen can take 30 seconds; if you're using a serial connection with the LaserJet set at 9600 bps, be prepared to wait as long as 2 or 3 minutes. Character screen captures are usually quick because the PC is transmitting little more than 2K of data. However, an EGA graphics screen may represent over 100K of data—and the same transaction will take considerably more time.

Flexibility. A capable utility enables you not only to faithfully reproduce the screen on a piece of paper, but also to adjust an image's aspect ratio (the relationship between the horizontal and vertical dimensions of the screen); rotate a captured image; crop it; and add text, inverse video, shading, and other special effects. Better still, some screen-capture programs will store a screen to disk, allowing you to print it out from another PC. If the file is compatible with other graphics, painting, and desktop publishing programs, the possibilities for manipulation are practically endless.

Print quality. With graphics screen captures, print resolution is directly related to the number of pixels produced on the monitor. Thus, the Hercules Graphics Card (with its 720-by-348-pixel resolution) produces the best results, followed in descending order by the EGA and the CGA. When text can be displayed in either character or bit-mapped mode, opt for the former—the resolution is superior.

Cost. Getting the right screen shot isn't a wallet-bending affair. Some techniques and utilities are free, although they're severely limited; more capable utilities cost between $50 and $100.

Remember that color is also part of the equation. Although screen-capture utilities don't translate

color text into shades of gray, some attempt to represent color graphics. At press time, the only utility truly capable of this feat was *Grafplus*, which produces black and three shades of gray on the LaserJet. The scheme assigns the darkest gray to blue, and the lighter grays to green and red.

Gift-Horse Screen Shots

Screen-capture utilities mirror the diversity found in display technology, and there are programs for almost every need, display, and budget. Several free tools are available for taking shots on systems with the IBM MDA or CGA, the Hercules Graphics Card, or boards emulating their modes. Although their capabilities are rudimentary, these tools might be all you need.

The cheapest, of course, is <Shift>-<PrtSc>. In spite of the limitations noted earlier, it can produce screen shots on systems using the MDA or any video board in text mode. Keep in mind that the results are not always pretty. For example, if you transmit a typical *Microsoft Word* screen to a LaserJet without a font cartridge, the special graphics characters that constitute borders, foreign language characters, and so on, are printed as something altogether different (see Figure 2). The problem stems from a simple mismatch: The graphics characters stored in the MDA are different from those used by the LaserJet's default internal Courier font. For example, when the corner of the *Word* border ╗ arrives at the LaserJet, the corresponding value (ASCII 187) is translated as a £. With few exceptions, similar garbling will occur with other HP internal, cartridge, and downloadable fonts. In short, use <Shift>-<PrtSc> for reference only.

Figure 2: Immediate gratification has its disadvantages: a screen capture of a Word text screen using just <Shift>-<PrtSc> on a LaserJet

```
1ëëëë0ªªªªªªªªª1ªªªªªªªªª2ªªªªªªªªª3ªªªªªªªª£2ëëëë[ªªªªªªªªª1ªªªªªªªª2ªªªªªªª{
æ   £PC EDISON                               ¤æ*   Outline - PC Edison         ¤
¤                                            ¤¤*                               ¤
¤                                            ¤¤*   I.   Program Overview       ¤
¤     For those of you engineers who  are    ¤¤*   II.  What Makes Edison Tick ¤
¤     tired of thinking but  still  would    ¤¤*   III. Back Off Scoffers!     ¤
¤     like  a  patent  or  two  to   your    ¤¤*   IV.  Tests on Aircraft      ¤
¤     credit, PC Edison  is  the  program    ¤¤*   V.   Tests on Little Gismos ¤
¤     you've been waiting for.  Using  a     ¤¤*   VI.  Tests on Toys          ¤
¤     unique  set  of  natural   language    ¤¤*   VII. Conclusion: A Genius!  ¤
¤     queries and artificial intelligence    ¤¤*                              ¤
¤     routines,   the   program   quickly    ¤¤                                ¤
¤     ferrets out what  it  is  that  you    ¤¤                                ¤
¤     want to invent, and then produces a    ¤¤                                ¤
¤     full  set  of  specifications   and    ¤¤                                ¤
¤     blueprints on  your  plotter  while    ¤¤                                ¤
¤     you wait. And the proof is  in  the    ¤¤                                ¤
¤     pudding. We built  and  tested  two    ¤¤                                ¤
¤     lighter-than-air craft designed  by    ¤¤                                ¤
¤     Ed and then  matched  them  against    ¤¤                                ¤
àeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee¥àeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee¥
FORMAT: Character Paragraph Tabs Footnote Division Running-head Style

Select option or type command letter
Page 1   {}                         ?              EX Microsoft Word: DUMPIX4.DOC
```

Figure 3: A character-mode screen capture made with the Font 10 downloadable font from Orbit Enterprises

```
1════0          1         2         3       ╕2════[         1         2        ╕
╪    PC EDISON                               ╪*   Outline - PC Edison          ║
║                                            ║*                                ║
║                                            ║*   I.   Program Overview        ║
║     For those of you engineers who  are    ║*   II.  What Makes Edison Tick  ║
║     tired of thinking but  still  would    ║*   III. Back Off Scoffers!      ║
║     like  a  patent  or  two  to   your    ║*   IV.  Tests on Aircraft       ║
║     credit, PC Edison  is  the  program    ║*   V.   Tests on Little Gismos  ║
║     you've been waiting for.  Using  a     ║*   VI.  Tests on Toys           ║
║     unique  set  of  natural   language    ║*   VII. Conclusion: A Genius!   ║
║     queries and artificial intelligence    ║*                                ║
║     routines,   the   program   quickly    ║*                                ║
║     ferrets out what  it  is  that  you    ║*                                ║
║     want to invent, and then produces a    ║*                                ║
║     full  set  of  specifications   and    ║*                                ║
║     blueprints on  your  plotter  while    ║*                                ║
║     you wait. And the proof is  in  the    ║*                                ║
║     pudding. We built  and  tested  two    ║*                                ║
║     lighter-than-air craft designed  by    ║*                                ║
║     Ed and then  matched  them  against    ║*                                ║
╚════════════════════════════════════════════╝╚════════════════════════════════╝
FORMAT: Character Paragraph Tabs Footnote Division Running-head Style

Select option or type command letter
Page 1   {}                         ?              OT Microsoft Word: DUMPIX4.DOC
```

LaserJet Plus users shackled to text-based systems needn't gnash their teeth. With Orbit Enterprises' free *Font 10* disk font, you can produce quick, clean character screen prints. Unlike most LaserJet fonts, which rely on a Roman-8 symbol set, *Font 10* uses nearly the same character set as the MDA. Using *Font 10* is a matter of typing **COPY/B** *N*:**FT10.SFP LPT1**: at the DOS prompt to download the font to the LaserJet's memory. (Because disk fonts are binary files, you must use the /B copy option; *N* indicates the drive and directory where the file is stored.) Once *Font 10* is in place, load the program you want to take a snapshot of, display the desired screen, and press **< Shift > - < PrtSc >** (see Figure 3).

Those using the CGA or the Hercules Graphics Card can do bargain-basement graphics screen captures with *Print Screen*, a memory-resident utility provided free to LaserJet owners by HP and authorized dealers. With a CGA, load the program by typing **LaserJet < Enter > A** if the LaserJet is operating at 9600 bps or **LaserJet < Enter > B** if it's operating at 19,200 bps. Display the screen and press **< Shift > - < PrtSc >** to dump it to the printer. With the Hercules board, type **Hercules** to load the program. Then display the screen and press **< Shift > - < PrtSc >**, followed by **1** or **2** to indicate which screen buffer to empty. Some programs use the first, others the second. The simplest way to find out is to guess—if a checkerboard pattern rolls out of the LaserJet, you've chosen the wrong buffer.

The Y Cartridge Solution

LaserJet and LaserJet Plus owners who already have HP's $330 92286Y font cartridge can save the postage to Orbit Enterprises. The Y cartridge has several advantages over *Font 10:* It can be used on both the LaserJet and the LaserJet Plus; character reproduction is better; and you can choose from Courier 12-point medium, bold, and italic, and Line Printer 8½-point medium fonts. The set of four fonts nearly matches the MDA's character set. The Courier fonts can be printed only in standard portrait (vertical) orientation; the Line Printer font can be printed in either portrait or landscape (horizontal) orientation.

Since Courier 12-point medium is the Y cartridge's default, you merely press **< Shift > - < PrtSc >** to take a snapshot. To use the cartridge's other fonts, you must issue the appropriate font selection code along with a code that forces the LaserJet to match the font's line spacing. (Courier fonts require 6 lines per inch and the Line Printer font, 8 lines.) The 2-line BASIC programs in Listing 1 produce the proper font and line-spacing selections.

You can create each BASIC program with EDLIN, *SideKick*, or any ASCII text processor and run it with a batch file. For example, to create the program that switches the LaserJet to the Courier 12-point bold font in portrait orientation, type

```
10 LPRINT
CHR$(27);"E";CHR$(27);"(s3B";CHR$(27);"
&l6D"
20 SYSTEM
```

CHR$(27) is the escape character, ASCII 27, which must always precede a LaserJet control sequence; E resets the LaserJet to its default parameters to ensure that no resident font will override the font being selected; (s3B selects the bold character; and &l6D (note, that's a lowercase *l*, not a 1) sets line spacing at 6 lines per inch.

Save the program as COUR12BP.BAS. Open another new file with the text processor, type **BASICA COUR12BP.BAS**, and save the file as COUR12BP.BAT. To

Courier 12-point medium (portrait)

```
10 LPRINT CHR$(27);"E";CHR$(27);"(s0S";CHR$(27);"&l6D"
20 SYSTEM
```

Courier 12-point bold (portrait)

```
10 LPRINT CHR$(27);"E";CHR$(27);"(s3B";CHR$(27);"&l6D"
20 SYSTEM
```

Courier 12-point italic (portrait)

```
10 LPRINT CHR$(27);"E";CHR$(27);"(s1S";CHR$(27);"&l6D"
20 SYSTEM
```

Line Printer 8½-point medium (portrait)

```
10 LPRINT CHR$(27);"E";CHR$(27);"(s16.66H";CHR$(27);"&l8D"
20 SYSTEM
```

Line Printer 8½-point medium (landscape)

```
10 LPRINT CHR$(27);"E";CHR$(27);"&l1O";CHR$(27);"(s16.66H";
   CHR$(27);"&l8D"
20 SYSTEM
```

Listing 1: The BASIC programs shown here select fonts from Hewlett-Packard's Y cartridge.

install the 12-point bold font, merely type **COUR12.BP** at the DOS prompt. The batch file loads and runs the BASIC program, the proper codes are sent to the printer, and the SYSTEM command returns control to DOS. Now load the application, and snap the screen shot.

Fully Powered Screen Shots

The methods and tools described so far—<Shift>-<PrtSc>, Orbit's *Font 10* disk font, and HP's *Print Screen* and Y cartridge—are limited to one or two video modes. You can substitute one font for another, but you can't adjust such image attributes as inverse video, size, and aspect ratio.

But for only a few dollars each, *Grafplus* from Jewell Technologies and *Hotshot* from Symsoft can produce snappy-looking output. Although *Grafplus* produces acceptable text screen shots, its forte is bit-mapped graphics. The program works with nearly 20 video boards, including the entire IBM line—from the MDA to the Professional Graphics Adapter—plus high-resolution boards from Tecmar, Hercules, Everex, Persyst, Sigma Designs, and others. *Hotshot* works only with screens in text mode, but the power it offers in printing, modifying, and merging screen shots with text produced by other programs is considerable. Keep in mind that regardless of the display mode, *Grafplus, Hotshot,* and most screen-capture programs bypass internal, cartridge, and disk fonts in favor of the LaserJet's raster graphics mode.

Grafplus Up Close

In addition to accommodating almost any monochrome or color graphics setup, *Grafplus* supports inverse video and can handle *1-2-3* and *Symphony* graphics. It can't merge screen shots into a page of text, but if that isn't a requirement, *Grafplus* might be the only screen-capture program you'll ever need.

Grafplus's talents embrace a range of printer types. The crucial component is Graflasr, a module designed specifically for capturing screens on ink jet printers and the LaserJet. To load the program, type **Graflasr** at the DOS prompt, answer a series of questions about the monitor and printer in use, and specify how the screen should be printed. For example, the program provides two options for printing character screens. If you answer Y to the question 'Print text screen as graphics?' Graflasr reproduces the screen faithfully, including borders and other graphics characters. If you enter N, the program spits out a quick-and-dirty screen shot without accurately reproducing graphics characters.

With Graflasr installed, printing a screen is as easy as pressing <Shift>-<PrtSc>. However, the real beauty is being able to manipulate the image before it hits the page. You determine certain options each time you load the program, such as whether to print with black and white reversed or whether to use portrait rather than landscape orientation (see Figure 4). You can also stipulate any number of options from the DOS command line. For example, typing **Graflasr -1** indicates that the image should be printed with black and white reversed.

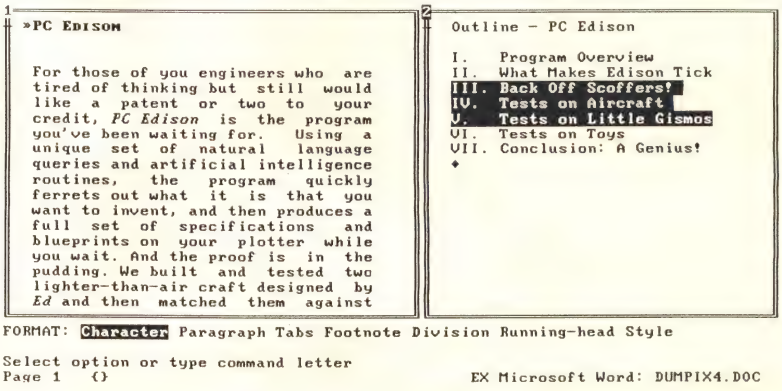


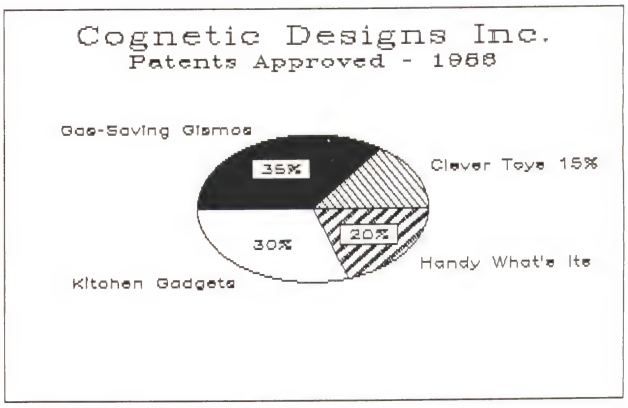
Figure 4: A bit-mapped Word document captured by a Hercules Graphics Card with Graflasr. Note that text, italicized text, and inverse video are faithfully reproduced.

If you want to tap further options, you must turn to Grafplus's Editgraf module. Editgraf resets Graflasr's defaults for resolution, image size, aspect ratio, orientation, and placement of the image on the page. You can even configure Graflasr to crop a captured screen automatically. The process is relatively straightforward. For example, to change Graflasr's default print resolution of 100 dots per inch (dpi), you type **EDITGRAF** at the DOS prompt. Then, in answer to the question 'What characters are sent to set print density?' you type **/027*t***n***R**, where *n* is the resolution in 75, 100, 150, or 300 dpi.

The resolution command naturally affects the size of the printed screen. A 100-dpi image is nine times larger than its 300-dpi equivalent. You can also alter image size by changing the number of horizontal and vertical pixels printed. The most faithful reproduction results when the number of pixels printed matches or exceeds the number displayed. On a system with a Hercules Graphics Card, for example, that means specifying a screen of at least 720 pixels across by 350 down, and on an EGA system, 640 by 350. Of the four common display adapters, systems with the EGA or the Hercules Graphics Card produce the sharpest graphics screen shots.

Of course, a crisp printout isn't worth much if the image is distorted. Remember that the pixels used by most computer monitors are rectangular (taller than they are wide), while the LaserJet prints square dots. As a result, some objects may appear flattened when transferred from screen to paper (see Figure 5). By playing with Editgraf's aspect ratio function, you can alter the horizontal and vertical dimensions of an image until it's right. Avoid reducing the number of horizontal or vertical pixels to less than the screen resolution, or image quality will deteriorate. Whenever possible, increase the pixels in the appropriate dimension to fill out the image.

Screen images can also be positioned anywhere on a page. Graflasr's default coordinates—/027&a200H and /027&a1000V—place the screen shot approximately 200 decipoints from the left edge of the page and 1000 decipoints from the top (1 decipoint equals 1/720 inch). To move the image elsewhere, replace 200 and 1000 with different numbers and enter the change with Editgraf. Cropping is limited, since you can shave pixels from only the right and bottom edges of a picture. If this restriction cramps your style and you're using a relatively sophisticated graphics program that allows you to rotate a hand-drawn picture or even a bar chart (as does Micrografx's *Windows Draw*), you may want to flip the image before taking a screen shot. To crop a captured screen, you simply answer the program's question 'How many horizontal/vertical pixels should be clipped?'



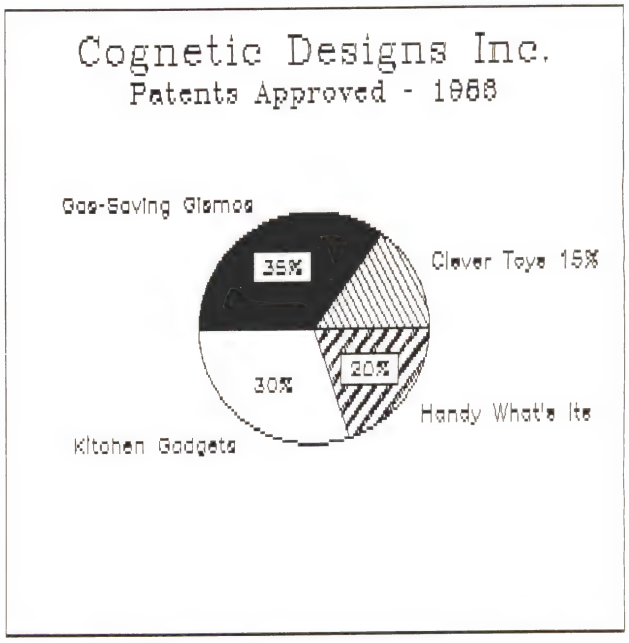


Figure 5: Before and after. The chart at the top is an unaltered screen shot made on a CGA-equipped system with Graflasr. By playing with the aspect ratio function, you can shape the image to your own ends.

As with most Graflasr functions, you can specify black-and-white reversal when you load the program or install the option permanently with Editgraf. One final feature is a godsend for those who don't have ready access to a LaserJet: You can direct Editgraf to save a captured screen to disk and then later print the file on a suitably equipped system.

Hotshot: Text Control

Hotshot doesn't quite live up to its moniker—it deals only with the LaserJet Plus and character screens. But once it's installed, you can summon *Hotshot* with a redefinable <Alt>-H hot key. Whereas *Grafplus* forces the user to memorize indecipherable codes, *Hotshot*'s menu-driven interface and intuitive command structure make selecting options a breeze.

Those in a hurry can print an unadorned screen in about 20 seconds on a LaserJet that's connected to a parallel port; if the printer uses a serial port, expect to wait several minutes.

As with *Grafplus*, a captured screen can be manipulated to your heart's content. You can print images in three sizes: small (1½ by 2½ inches) and large (3¾ by 7½ inches) at 150 dpi; and medium (2½ by 5 inches) at 300 dpi. As you might expect, the 300 dpi medium-size screens are the sharpest. Before you trigger the screen capture, you can erase portions of the screen and add a title, arrows, boxes, shading, and a border. Not only does *Hotshot* faithfully reproduce inverse video, it even enables you to "paint" inverse video onto the screen to highlight passages. To alter a screen, display *Hotshot*'s main menu by pressing <Alt>-H; functions such as Erase, Shade, Left Margin Cropping, Annotate, and Draw are available at the touch of a function key. Once you activate Erase, for example, you simply wipe out areas by moving the cursor across the screen. You can save a *Hotshot* screen capture to disk and print it out on another system or insert the file into a document.

A Marriage of Convenience

With the right screen-capture program, you can eschew import utilities, clipboards, and other electronic tote bags and thereby simplify text and graphics integration. Although most screen-capture programs still dwell in the dark ages, *Hotshot* includes a utility that converts its proprietary file format into the .PCX format used by *PC Paintbrush, Ventura Publisher, PageMaker,* and other graphics and desktop publishing programs. Once a captured screen is sucked up by one of these programs, you can manipulate it like any other graphics element.

> Hotshot *includes a utility that converts its proprietary file format into the format used by* PC Paintbrush, Ventura Publisher, PageMaker, *and other programs.*

Inset from APG Software is another memory-resident screen-capture program on the move. Although it supports only the CGA and the Hercules Graphics and Color cards, captured screens can be saved to disk and popped into almost any text file. The process isn't particularly elegant: You save the screen as a file, exit the application, load your word processor, open a document, and insert the screen file name (identified with the .PIX extension) at the desired location in the text. You must print the document with *Inset* resident; when the screen file is encountered in the text, *Inset* takes over and prints the image in the proper spot. You can't preview this montage on screen—you have to print out the page to view the gap between the text and the imported screen.

As screen-capture programs go, *Inset* has its advantages. Screens can be printed in four sizes—ranging from 1¼ by 2½ inches at 300 dpi to a full page at 37½ dpi—and oriented in four positions. The company claims that *Inset* version 2 will not only support the EGA but also permit variable sizing and

adjustment of the aspect ratio and allow screens captured from one display mode to be viewed on another. In Macintosh-like fashion, this revamped *Inset* purportedly will allow you to copy, move, and zoom images; do detailed fat-bit-like editing and fills; generate lines and rectangles; and preview a screen shot nestled in a document.

This brew of solutions reflects all too clearly the current chaos in the PC universe of incompatible display standards and printers. For the time being, taking picture-perfect screen shots means mastering a grab bag of tricks. So until a single video standard and *Microsoft Windows* (or some other graphics-oriented software integrator) dominate the marketplace, you'll want to keep your own grab bag well stocked.

Contributing Editor Ted Nace is the coauthor of LaserJet Unlimited, *(Peachpit Press, Berkeley, California, 1987) and editor of Peachpit Press's* LaserJet/DDL Insider *newsletter.*

92286Y Font Cartridge
Hewlett-Packard
11311 Chinden Blvd.
Boise, ID 83714
208/323-2551
List price: $330
Requirements: Hewlett-Packard LaserJet or LaserJet Plus

Font 10
Orbit Enterprises, Inc.
P.O. Box 2875-B
Glen Ellyn, IL 60138
312/469-3405
List price: free
Requirements: LaserJet Plus, IBM Monochrome Display Adapter or compatible board

Grafplus version 2.5
Jewell Technologies, Inc.
4302 S.W. Alaska #207
Seattle, WA 98116
206/937-1081
List price: $49.95
Requirements: 8K, one disk drive, DOS 2.00 or later version
Not copy protected

Hotshot
Symsoft
P.O. Box 4477
Mountain View, CA 94040
415/962-9500
List price: $99.95
Requirements: 60K, one disk drive, DOS 2.00 or later version
Not copy protected

Inset version 1.1B
APG Software
12 Mill Plain Rd.
Danbury, CT 06811
203/794-0333
List price: $99
Requirements: 85K, one disk drive, DOS 2.00 or later version
Not copy protected

Print Screen
Hewlett-Packard
11311 Chinden Blvd.
Boise, ID 83714
208/323-2551
List price: free
Requirements: 3K, one disk drive, DOS 2.00 or later version
Not copy protected

Unleashing Framework

Framework users, there's a cure for 1-2-3 envy. With a few short FRED programs, you can add custom utilities to Framework's spreadsheet and make it hop, skip, and even jump.

Richard Katz

When you stuff four or five applications into a single program, something's bound to give. When push came to shove in *Framework*, the spreadsheet module got the short end of the disk. Both critics and converts alike panned the program's sluggish performance, restricted spreadsheet size, and limited functions. Ashton-Tate addressed these and other problems with the release of *Framework II*, but those who cut their teeth on *1-2-3*, *Symphony*, and other high-powered spreadsheet programs still balked at the lack of certain amenities.

Balk no more. Although all the goodies you might want in a spreadsheet aren't perched on a *Framework* pull-down menu, you can add a host of features that match or even surpass *1-2-3*'s. The tools of this trade are user-defined functions created with FRED, *Framework*'s built-in command language.

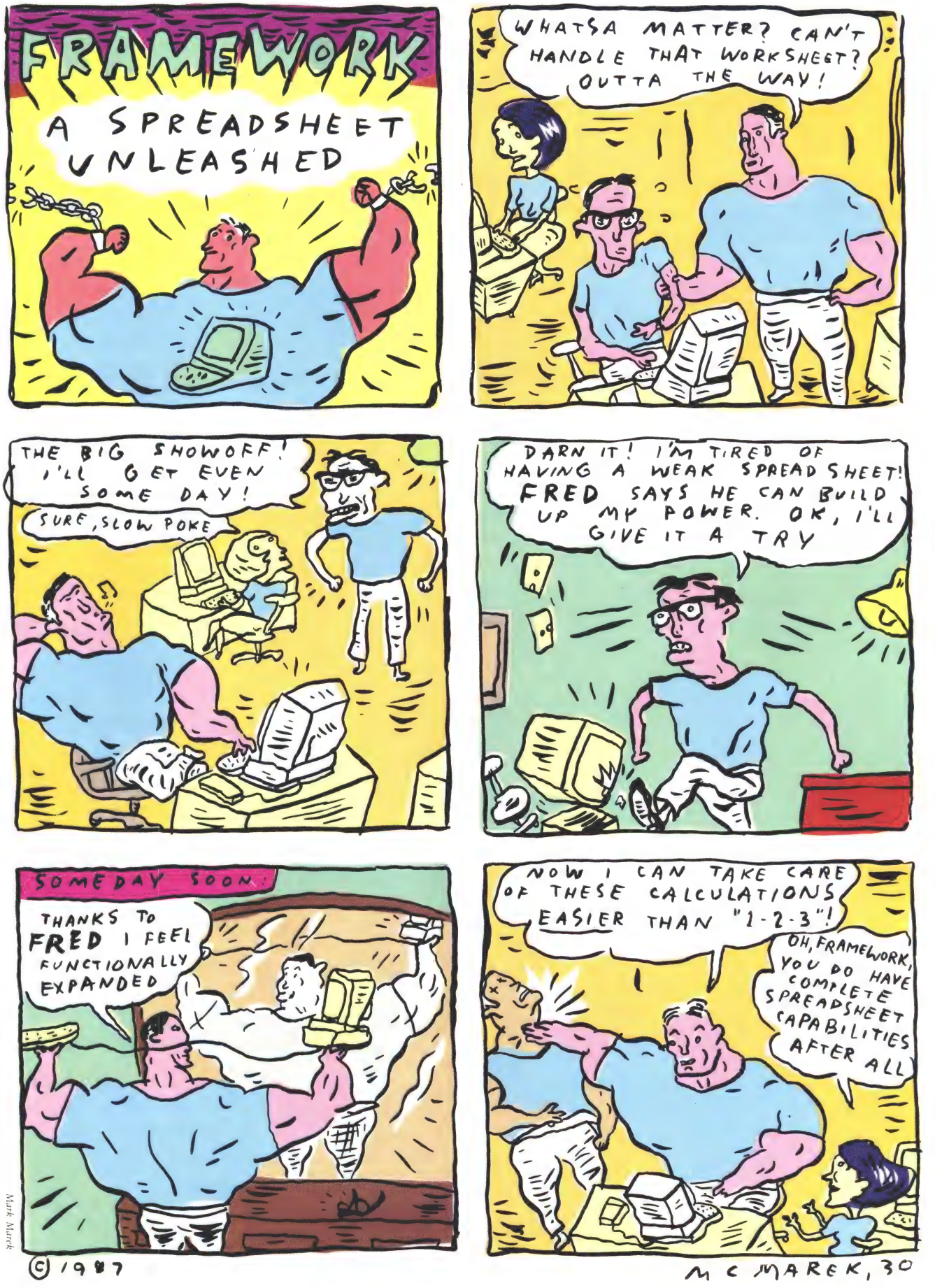
Central to such power, of course, is *Framework*'s seamlessly integrated environment. By storing FRED programs as keyboard macros, you can call up a custom function with an <Alt>-*key* combination. Note, too, that a *Framework* worksheet cell isn't limited to a single formula—it can contain a whole series of formulas (in effect, a FRED program) that can be executed once or repeatedly whenever a given condition is true.

Thus a *Framework* spreadsheet can be as powerful as the FRED programs you create. Of course, extending *Framework* in this manner is the stuff of books. In this article you'll discover how to drive FRED programs with keyboard-like macros and, as a finale, create a custom-fit cross-tabulation feature that contemporary spreadsheets can't begin to match.

A FRED Date Maker

Framework generates macros by recording your keystrokes as you run the program through its paces and then depositing the results in a special frame called the Library Cabinet. The recorded session can be quickly replayed by pressing an assigned <Alt>-*key* combination. Open the Library, and you'll find macros stored in individual subordinate frames labeled with each macro's <Alt>-*key* assignment. You can open a frame, edit the captured session, and even add comments to document a macro's function.

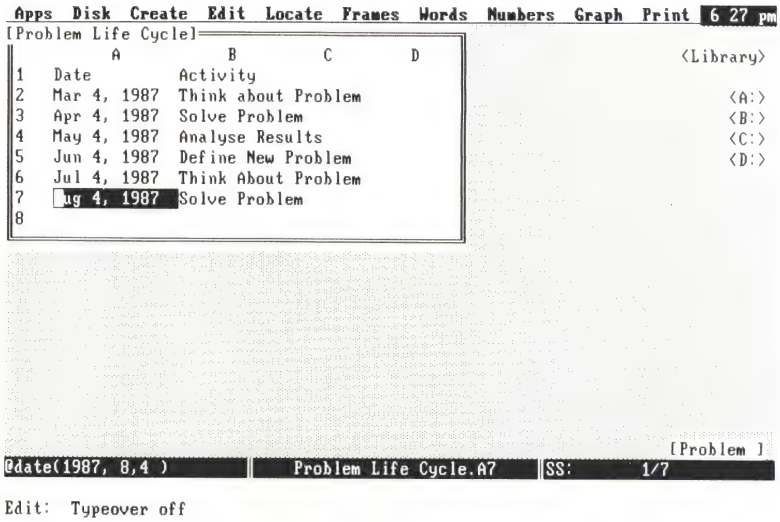
To store a FRED program as a keyboard macro, you open a Library frame and type in the relevant code from scratch, bypassing the recording process altogether. For example, consider how you might simplify date entry in a *Framework* worksheet.


FRAMEWORK
A SPREADSHEET UNLEASHED
WHATSA MATTER? CAN'T HANDLE THAT WORKSHEET? OUTTA THE WAY!
THE BIG SHOWOFF! I'LL GET EVEN SOME DAY!
SURE, SLOW POKE
DARN IT! I'M TIRED OF HAVING A WEAK SPREAD SHEET! FRED SAYS HE CAN BUILD UP MY POWER. OK, I'LL GIVE IT A TRY
SOMEDAY SOON:
THANKS TO FRED I FEEL FUNCTIONALLY EXPANDED
NOW I CAN TAKE CARE OF THESE CALCULATIONS EASIER THAN "1-2-3"!
OH, FRAMEWORK, YOU DO HAVE COMPLETE SPREADSHEET CAPABILITIES AFTER ALL
Mark Marek
© 1987
M C MAREK, 30

Normally you enter a date in a *Framework* worksheet cell by typing in the formula @date (*year,month,day*). If you're building an accounting ledger with rows of dated entries, the novelty of this finger-bending exercise quickly pales. However, with a little effort you can create a macro-activated FRED program that prompts you for a date, displays a form for you to fill in, and converts entries (such as 8/4/87) into any desired format.

To get into the Library, press **< ScrollLock >**, highlight '<Library>' in the top right of the *Framework* desktop, and press **< GrayPlus >** to enter the Library frame. Move the cursor just below the 'Macro' section heading, create an empty frame, and label it {**Alt-D**}. To enter the FRED code "behind" this new frame, press **< F2 >** (formula edit), **< F9 >** (zoom), and type in the code in Listing 1. (Note that each comment in the listing is preceded by a semicolon.) When you're finished, press **< Esc >** and **< Enter >**.

You execute {Alt-D} just like a recorded macro. The next time you need to slip a date into a worksheet cell, press <Alt>-D, and *Framework* will lay a fill-in-the-blanks date form across the bottom of the screen and ask you to complete it (see Screen 1). The current year will already have been entered by the program, so all you'll need to do is type in the rest of the date and press <Enter>. The program will drop the appropriate @date formula into the current spreadsheet cell.



Screen 1: Dates without tears—or formulas. With this FRED date generator, all you do is point to the cell, press Alt-D, and type in the month and day. Framework does all the dirty work and drops a properly formatted date into place.

Making Dates

Why, you might ask, should you use a FRED program instead of a macro? The answer is control. Like a BASIC or Pascal program, a FRED application can test for any number of conditions and act accordingly. Yet FRED isn't nearly as fussy as a full-blown programming language; variables can store anything—text, numbers, dates, or logical values—and you don't have to declare the particular variable type.

Even so, Listing 1 may look like a PC version of "Kitten on the Keys." But if you're on speaking terms with BASIC and Pascal, you'll realize that *Framework*'s designers have molded familiar functions and structures from each to fit the specific needs of *Framework* applications.

The @local function sets up variables for the entered date *x* and the Typeover (tpo) status. Spreadsheet aficionados will recognize FRED's @if function, which tests whether an argument is true or false. As in *1-2-3*, if the argument is true, the second argument is performed; if false, the third. But with FRED, you can include several formulas in the second or third argument by enclosing them with @list.

Listing 1's first @if test uses the @sense function, which detects certain conditions within *Framework*. When you press Alt-D, it determines if Edit Typeover (#ET) is on. (Typeover must be on for this routine or the year on the screen will be pushed to the right when you enter the day and month.) If Typeover is already on, @sense returns the value TRUE and @if sets tpo: = 1. (As in Pascal, a variable and its contents are linked with a colon followed by

an equal sign [: =].) If Typeover is off, the formula following @list comes into play. The variable tpo is set to zero and the @performkeys function takes your seat behind the keyboard, issuing the command <Ctrl>-E T to toggle Typeover on.

FRED's @inputline function is somewhat akin to BASIC's INPUT statement, prompting you here for the date, displaying a date mask with the year filled in, and storing your keystrokes in the variable *x*. If you've used BASIC's MID$ function, you'll have no trouble grasping @mid. This general-purpose text extractor retrieves the first two digits of the year from @today, which stores the date entered at the DOS prompt or the one supplied by a clock/calendar board. Then under the aegis of @performkeys, it snatches the two digits of the year, plus the month and day you type into the on-screen date form, completes the @date formula, and drops it into the worksheet cell. For the sake of tidiness, the last @if statement turns Typeover off if it was off originally.

```
@local(x,tpo),

@if(
        @sense(#ET),                          ; Is Typeover on?
     tpo:=1,                                  ; Yes? set tpo to 1
     @list(tpo:=0,@performkeys("{Ctrl-E}t")) ; No? turn it on
),                                            ; Endif

; Display date form, get the date, store in x

x:=@inputline
      ("Enter Date:Mo/Da/Year","  /  /" & @mid(@integer(@today),3,2)),


; Fill in the @date function, the date, and required commas

    @performkeys("@date(19" & @mid(x,7,2) & ","
                            & @mid(x,1,2) & ","
                            & @mid(x,4,2) & "){return}"),


; If typeover was initially off--i.e., if tpo = 0--then turn it back off

@if(tpo=0,@performkeys("{Ctrl-E}t"))
```

Listing 1: The FRED code that creates the Alt-D date mask

The Total Menu

At the heart of most spreadsheet formulas is the @sum function. Whether you use *1-2-3* or *Framework*'s spreadsheet, you typically point to a cell where the total will appear, type in @sum, and specify the range to total.

But why wrangle with formulas when you can reduce the entire process to a few keystrokes? With the FRED program in Listing 2 installed, you merely place the cursor on a cell and press <Alt>-T.

```
@performkeys("@sum("),
@rangemenu,
@performkeys("){return}"),


RangeMenu

; @menu creates a menu from Rangemenu's subordinate frames

@menu(Rangemenu)


Column

@performkeys("{dnarrow}{uparrow}{f6}{Ctrl-PgUp}{dnarrow}{return}"),
@quitmenu


Row

@performkeys("{dnarrow}{leftarrow}{f6}{Home}{rightarrow}{return}"),
@quitmenu


Other

@local(X),

; The #YES permits cursor pointing

X:=@inputline("Enter range reference -- i.e. B2:D7",,#YES),
@performkeys(x),
@quitmenu
```

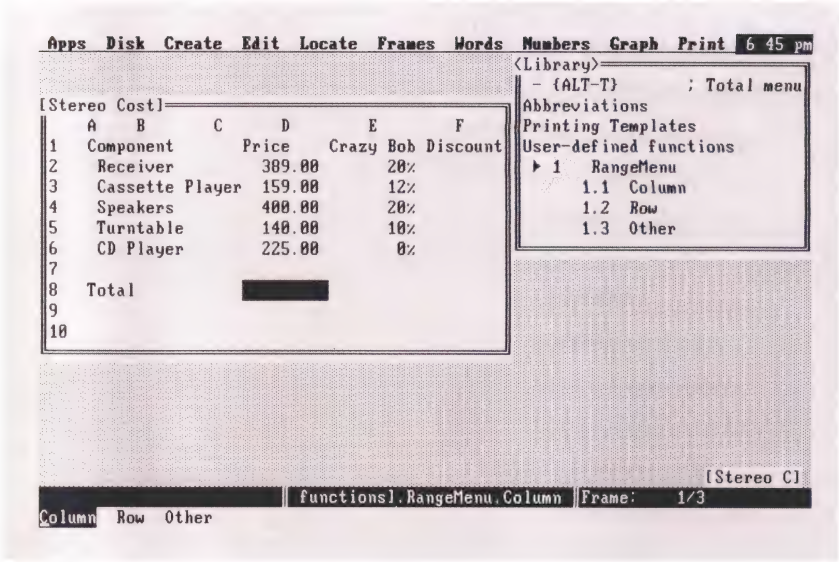
Listing 2: The FRED totaling utility

A menu at the bottom of the screen presents the choices Column, Row, and Other (see Screen 2). Highlight an option and press <Enter> (or type the option's first letter), and the program totals all cells above the current cell, to the left of the cell, or from any range you type in or highlight.

To install this handy utility, create a frame called {Alt-T} in the 'Macro' section of the Library, then open a frame under the 'User Function' section and label it **< RangeMenu >**. Press **< Ctrl > - < GrayPlus >**, then press **< Ctrl > - C E** two times to open frames labeled Column, Row, and Other. Finally, point back to 'RangeMenu' and press **< Ctrl > - F N** to activate Frame Numbering. (Frame Numbering confines FRED-generated menus to the bottom of the screen. If the RangeMenu frame is left unnumbered, the menu will fill the entire screen.) In *Framework*'s outline the relationships would look something like this:

1 RangeMenu
- 1.1 Column
- 1.2 Row
- 1.3 Other

Highlight each frame's border (include {Alt-T}s), press **< F2 >** and **< F9 >**, and enter the appropriate FRED code shown in Listing 2. Finally, you can add a short description for each option by typing text into the document area of each frame. Highlight the Column frame, press **< F9 >**, and type **Puts total of current column in current cell.** Enter similar messages in the Row and Other frames.



Screen 2: Calculator on call: pick a total cell; press Alt-T; and select row, column, or range from the menu. The FRED program behind the scenes calculates the total and inserts it in the cell.

Behind the Scenes

Point to where you want a total to appear and press <Alt>-T. The FRED code nestled securely in the Library comes to life. The @performkeys function starts the ball rolling by entering the beginning of the @sum formula into the totaling cell. @rangemenu passes execution to the @menu (rangemenu) function in the RangeMenu frame, which creates a menu from the subordinate frames' Row, Column, and Other.

Highlight an option and your previously entered message appears; press <Enter> and the code in the frame is executed. As you can see, @performkeys does much of the work in the Column and Row frames, moving the cursor in the proper direction and selecting the range for @sum. Note that column A and row 1, which typically contain labels, are excluded by the last {dnarrow} in the Column frame and {rightarrow} in the Row frame.

If you select Other, you must type in a range or highlight the cells to be summed. Either way the information is stored in the variable *X*, which is used by @performkeys to supply the range for @sum. The @quitmenu function returns control to the {Alt-T} frame, which finishes the job by supplying the closing right parenthesis for @sum and issuing {return}. The cell formula is complete, and the total appears in the worksheet.

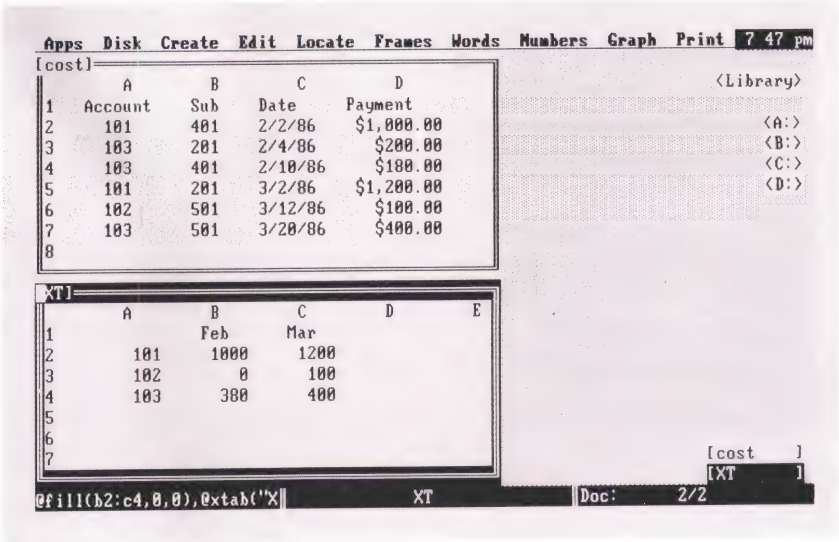
Expanding {Alt-T} to encompass other functions is relatively simple work. For example, you could modify {Alt-T} to present a menu of different calculation functions that use functions such as

@avg, @count, @min, and @max. The process is straightforward: remove @performkeys-("@sum(") from the {Alt-T} frame and replace it with a call to another menu, such as @functionmenu.

Then set up a FunctionMenu family of frames in the 'User Function' section of the Library (as you did with RangeMenu), and place calls like @performkeys-("@sum(") in subordinate frames. The hierarchy might look like this:

2 FunctionMenu
- 2.1 Sum
- 2.2 Avg
- 2.3 Count
- 2.4 Deviation

You can include as many functions as you want, but remember that each menu option must start with a different letter.



Screen 3: What Framework lacks, FRED provides. This cross-tabulation utility rearranges data in the top worksheet and spits out the result in the bottom worksheet in seconds.

Feasting on Tables

So much for the appetizers. The main course for many business users is cross-tabulation—the collating, ordering, and subtotaling of related information. A market researcher sifting through thousands of responses needs to determine how many people in different age groups answer a given question. A manager responsible for six regional sales forces needs not one cross-tabulation, but several: by region, representative, time period, product, and so on. Both bookkeepers and comptrollers need cross-tabulation to analyze monthly spending trends and spot irregularities—and thus to better monitor expenditures.

Most contemporary spreadsheet programs (among them *1-2-3*) make cross-tabulation difficult or ignore it altogether. With *Framework*, however, if a function doesn't exist, you merely fabricate it.

Most contemporary spreadsheet programs make cross-tabulation difficult. With Framework, *if a function doesn't exist, you merely fabricate it.*

Consider the accounts payable Cost worksheet in Screen 3. Automatically rearranging this data and summarizing payments by account and month would tax most spreadsheet macros. But @xtab, a general-purpose cross-tabulation program written in FRED, can tackle the job with aplomb and even place results in a separate worksheet.

To create the @xtab function, open three frames in the 'User Function' section of the Library called Xtab, Month, and Strget, and enter the FRED code shown in Listing 3. Create the Cost worksheet and a second worksheet named XT to hold the results of the cross-tabulation. Make sure

that the headings in both worksheets match.

To do its job, @xtab must be supplied with four parameters: the name of the worksheet receiving the cross-tabulated data (referenced as item1 in the listing), a column heading range (item2—which usually contains dates), a row heading range (item3), and the range of the data being totaled (item4). With the XT frame border highlighted, press **< F2 >** and **< F9 >**, and enter the formulas:

```
@fill(XT.B2:XT.C4,0,0),
@xtab("XT",cost.B2:cost.B7,cost.A2:
    cost. A7,cost.C2:cost.C7)
```

To set @xtab in motion, press **< Esc >** to return to the outside frame, and then press **< F5 >**, *Framework*'s recalculation key. The @fill function resets all cells in XT receiving cross-tabulated data (B2 through C4) to zero, while the next line calls @xtab and supplies it with the ranges it needs in the Cost worksheet. The results of the cross-tabulation are shown in Screen 3.

If you alter the ranges in the @xtab formula in the XT frame, *Framework* can easily generate other cross-tabulations, such as Account versus Date or Sub versus Payment. If @xtab spits out an error message noting it can't find a named cell address, chances are the headings in the two worksheets don't match. If the error persists, double-check the spelling of all headings and recalculate XT again. If difficulties persist, have no fear: *Framework* can help you find the problem in short order (see the sidebar "Debugging FRED Programs" for more information).

Automatically rearranging and summarizing payments by account and month would tax most spreadsheet macros. But @xtab, a general-purpose cross-tabulation program written in FRED, can tackle the job with aplomb.

FRED Loop-the-Loop

If you use *Framework*'s @trace function to follow the program as it cross-tabulates the Cost worksheet, you'll find that more than 652 statements are executed—far more than the single statement allowed by *1-2-3* or most other spreadsheet programs. Since @xtab's biggest job is sifting through all the cells in the worksheet, much of the processing is performed within a loop.

The loop begins at @while and ends just before @return(tot). The @get(@item2) and @get(@item3) functions latch on to the proper row and column in the Cost worksheet, while @get(@item4) retrieves the data from the current cell. The next block of code accumulates the subtotal, while the three @next functions at the bottom of the loop advance @xtab to the next row to start the processing anew. When the program runs out of data to chew on (in other words, when @xtab can't find another column heading in the Cost worksheet), the @get(@item2) <>#NULL! test in the first line of the loop returns a null value, and the loop ends.

Cell Affirmation

Finding the right data in the Cost worksheet and then incrementing the right cells in the XT worksheet are knotty tasks, even for a FRED program. For example, when the third row of the Cost worksheet is fed through @xtab, how does it sift out the right information and, just as important, how does it determine which cell in XT should be incremented by $200? Two *Framework* features hold the key: named cell addressing and the ability to execute a string variable as if it were a standard FRED function.

Named cell addressing eliminates the need for normal cell references, such as A12. Instead, a cell is identified by a name composed of the value in the first row of the cell's column plus the value of the cell's row. *Framework* can even display the spreadsheet pointer's position with named cell addressing. If you place the cursor on cell B2 in the XT worksheet and press !, the status line changes to read '[FEB 101]'—a valid address as far as *Framework* is concerned. The result? @xtab can

find and update a value anywhere in the worksheet as long as column and row headings are properly identified in the FRED code. To accomplish a similar (though limited) effect with *1-2-3*, you would have to assign a range name to every cell in a worksheet.

Thus, the only information @xtab needs are the values from the two current heading ranges. When the third row of the Cost worksheet is scooped up by the @get functions, the values 2/4/86 and 103 are sent to @strget and converted into a month name (Feb) and a text integer. @strget passes the resulting strings back to @xtab, which concatenates them with brackets and the worksheet name to form the cell address XT.[Feb].[101]. Now @xtab knows which cell should be credited the $200.

In practice, adding the $200 to the cell takes a bit more FRED footwork. With @, *Framework* can turn anything–including string variables–into a function. In this example, @xtab takes the cell address [FEB].[101] and stores it in a variable called command, making it equal to XT.[FEB].[101]: = XT.[FEB].[101] + @item1. Two lines down, command is turned into the function @command-(num). When this function executes, it receives the data value of num (namely, $200) as its own @item1 argument, plugs it into the formula (XT.[FEB].[101]: = XT.[FEB].[101] + 200), and saves the result in the XT worksheet. This operation is repeated until every row in the Cost worksheet is processed.

```
Xtab

; The function takes 4 parameters:  "XT", range1, range2, range3
; These are referenced in @xtab as item1, item2, item3, item4

; Declare local variables
@local(thiscol,thisrow,tot,num,thisref,command),

; Start at the first data row in the source spreadsheet
@reset(@item2),
@reset(@item3),
@reset(@item4),
tot:=0,

; For each row of source data
@while(@get(@item2)<>#NULL!,

   ; Get the row and column headings and
   ; refer to the right subtotal cell in CrossTabSheet
   thiscol:=@strget(@get(@item2)),
   thisrow:=@strget(@get(@item3)),
   thisref:=@item1 & ".[" & thiscol & "].[" & thisrow & "]",

   ; Get the payment data
   num:=@get(@item4),

   ; Create totaling command (@item1 picks up the argument num
   command:=thisref & ":=" & thisref & "+@item1",

   ; Accumulate the subtotal
   @if(@not(@iserr(@thisref)),                    ; Is thisref OK?
      @list(@command(num),tot:=tot+num),          ; Yes? Accumulate
      @prompt(thisref & " not found in " & @item1) ; No? Send prompt
   ),

   ; Advance to the next row, and repeat.
   @next(@item2),
   @next(@item3),
   @next(@item4),
   ),                                             ; End of loop

@return(tot)


Month

; Return the first three characters of the month name from a date
; If not a date, return "0"

@if(@iserr(@mid(@date1(@item1),1,3)),"0",@mid(@date1(@item1),1,3))


Strget

; Converts any value v to a text value:
; A date is converted to a month name, a number is
; converted to a text integer, text is returned unchanged

@if(@isnumeric(@item1),
     @return(@integer(@item1)),
           @if(@isalpha(@item1),
           @return(@item1),
           @return(@month(@item1)))
```

Listing 3: XTAB, the cross-tabulation utility

Debugging FRED Programs

If you make a mistake typing in the listings accompanying this article, never fear. *Framework* always indicates the source of an error by highlighting it with the cursor; the type of error is even indicated at the bottom of the screen.

For example, what happens if an error pops up when you try to cross-tabulate a spreadsheet using @xtab? Since the cursor is already on the formula that "calls" @xtab, pressing <F2> takes you to the source of the error.

If the message at the bottom of the screen reads, 'Called Function returned with an error', then you need to examine the @xtab code to correct the error. Press <ScrollLock> and open the Library Cabinet.

Point to the Xtab frame, press <F2> and <F9>, and the cursor alights on the error. Missing commas and parentheses are common mistakes, as are misspellings of FRED commands. By comparing the area the cursor highlights to the code printed in Listing 3, you should be able to zero in on any errors and correct them.

If the 'Called Function' error message appears when you again try to recalculate the XT worksheet, simply repeat the process. Write down the name of the function where the cursor is displayed. Press <Esc> twice, point to the appropriate function in the library, and press <F2> and <F9> to locate the error. Once the code is amended, return to the XT worksheet and recalculate it by pressing <F5>.

If @xtab fails to produce any totals but no error message appears, make sure you have correctly entered the ranges following the @xtab function in the XT frame border. 'XT' should appear first, column headings second, row headings third, and data range fourth. *–R. K.*

More Power to It

These utilities only hint at the numerous ways FRED can beef up *Framework*'s spreadsheet. As matters now stand, you know the basics of creating custom menus, special calculation utilities, and custom FRED functions. From here, it's a matter of exploring the intriguing array of possibilities, particularly those suggested by named cell addressing and custom FRED functions. With the former, you could easily give *Framework*'s spreadsheet near-relational capabilities. With the latter, you could automate almost any aspect of spreadsheet operations and call on the powers in other *Framework* modules. Who's got spreadsheet envy now?

Richard Katz is a software consultant who writes about personal computers and mainframes and is based in San Francisco or Minneapolis, whichever is colder. Contributions to this piece were made by Arthur English, an independent consultant and writer in Ambler, Pennsylvania.

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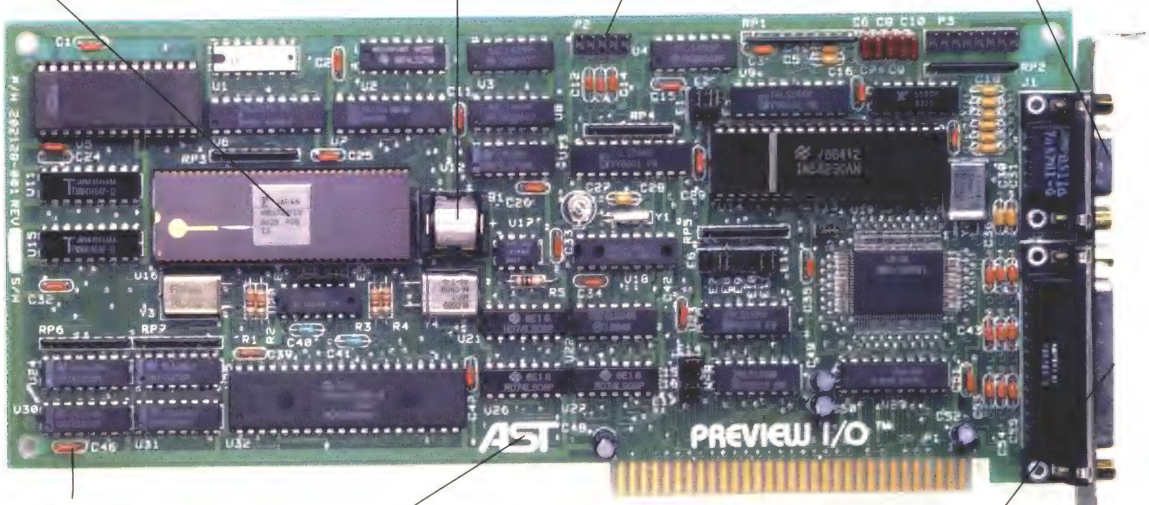

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Karl Koessel

Days of Our Spreadsheet

Q. I was surprised to discover that 1-2-3 release 2's date and time functions can't extract the day of the week for a particular serial date number. Can you supply me with a formula that would, for example, convert a serial date such as 31851 (the Ides of March 1987) into the appropriate day (namely, Sunday)?

Samuel Meyers
Morristown, New Jersey

A. Creating a formula that returns the day of the week for a given serial date number is quite easy with *1-2-3* release 2's string functions. *1-2-3*'s serial date numbering system assigns the value 1 to Sunday, January 1, 1900, 2 to Monday, January 2, 1900, and so on up to 73050 for Thursday, December 31, 2099. Dividing a date number by 7 yields a remainder between 0 and 6. If the remainder is 1, the day is Sunday; if 2, Monday; and so on.

Knowing this, you can write a formula that uses the @MOD function to retrieve the remainder and the @MID function to seek out the day in question from a string composed of the days of the week (see Figure 1). As written, the formula calculates the day of the week for a serial date number entered in cell A1. If the number appears in a different cell, merely substitute the appropriate cell address for A1 in the formula.

When you enter the formula in a *1-2-3* release 2 worksheet, make sure you replace the periods in the line with the same number of spaces. This simplifies the formula and enables *1-2-3* to find the beginning of each day name exactly 9 character spaces after the previous day name.

Parking Problem

Q. In "Avert Hard Disk Disaster," [PCW, November 1986], the author recommends parking a hard disk's read/write heads prior to turning the system off.

I can park the heads on my IBM AT by inserting the Diagnostics disk from the IBM Guide to Operations in drive A:, resetting the machine with <Ctrl>-<Alt>-<Del>, and choosing the 'Prepare System for Moving' option from the menu. But this procedure is rather time-consuming. Is there an easier way to park the hard disk on my AT?

Annette B. Gates
Richmond, Virginia

A. Yes, but first a warning: The following technique should be used only on an IBM AT (or XT) with an IBM hard disk. (Most third-party hard disks come with a parking utility or automatically park their heads when the system is shut off.) Furthermore, don't deviate from the procedure described here, and don't run any of the other programs on the AT Diagnostics disk from the DOS prompt—doing so may damage the hard disk.

I am assuming that your AT's AUTOEXEC.BAT file issues a PATH command that includes the directory C:\DOS, and that the directory exists. Although an extended search path is not essential, it allows DOS to call the PARK-.BAT batch file created below from any directory. If the PATH command doesn't specify the directory holding this file, you must log on

(continues)

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```
@MID("Saturday. Sunday ... Monday ... Tuesday.. WednesdayThursday. Friday",@MOD(A1,7)*9,9)
```

Figure 1: This 1-2-3 formula computes the day of the week for the serial date number entered in cell A1. The periods, which are placeholders, should be replaced by spaces.

to the directory containing PARK-.BAT before issuing the PARK command.

To create PARK.BAT, type the following lines at the DOS prompt, pressing <Enter> at the end of each line:

COPY CON: C:\DOS\PARK.BAT

C:

CD \DIAGS

DCOMMAND

Press **< F6 >** and then **< Enter >**.

Next, you need to create the subdirectory \DIAGS on drive C: and copy all the files on the Diagnostics disk into it. Type **CD** to log on to the root directory, then type **MD C:\DIAGS** and press **< Enter >**. Next, type **C** and press **< F3 >** followed by **< Enter >**. Slip the Diagnostics disk into drive A:, type **COPY A:*.* C:\DIAGS*.***, and press **< Enter >** one last time.

One last step and PARK.BAT will be ready to use. To prevent the COMMAND.COM file on the Diagnostics disk from being confused with the DOS command processor (also named COMMAND.COM), change the Diagnostics disk's COMMAND.COM to DCOMMAND.COM by typing **REN C:\DIAGS\COMMAND.COM DCOMMAND.COM** and pressing **< Enter >**.

(continues)

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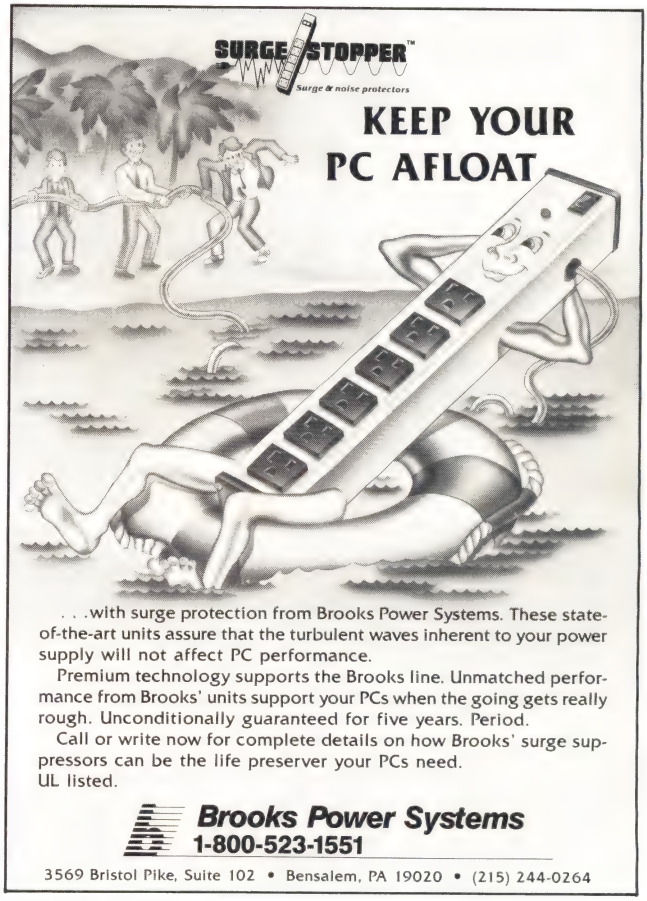

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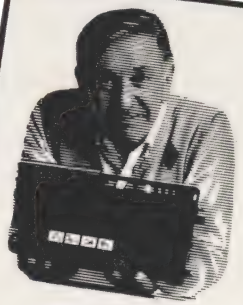

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A Quick Word

Q. When I expanded my PC's memory from 256K to 640K, I thought my copy of Microsoft Word *would operate faster. But it's still sluggish, particularly compared to programs such as* WordPerfect *and* 1-2-3. *Would I boost performance by putting my documents or* Word *in a RAM disk?*

Vatsala Venkatachalam
Cockeysville, Maryland

A. You can speed up *Word* only marginally by storing the document you're editing in a RAM disk. Besides, the risk of losing your edits due to a power failure or some other act of God outweighs the benefits of a modest speed increase.

Word will perk up if you store the program itself in a RAM disk. But remember that versions prior to 3.0 are copy protected, so you must create the RAM disk, copy the requisite *Word* into it, and then start *Word* with the program disk in drive A:. Once *Word* is up and running, you can remove the disk, but this method is hardly convenient.

Thankfully, version 3.0 eliminates such hassles, but the price of admission is still steep. A RAM disk holding the requisite files—WORD.COM, MW.PGM, MW.INI, MW.HLP, HYPH.DAT, and your printer's driver (a .PRD file)—would top 340K. (You can reclaim about 60K by cutting MW.HLP from the list.) Even without a RAM disk, version 3.0 runs considerably faster than its predecessors. If you're slogging along with an older version of the program, contact Microsoft and request upgrade information.

Regardless of the version, don't forget that *Word* will always run

(continues)

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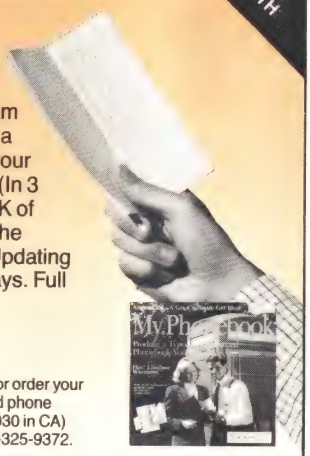

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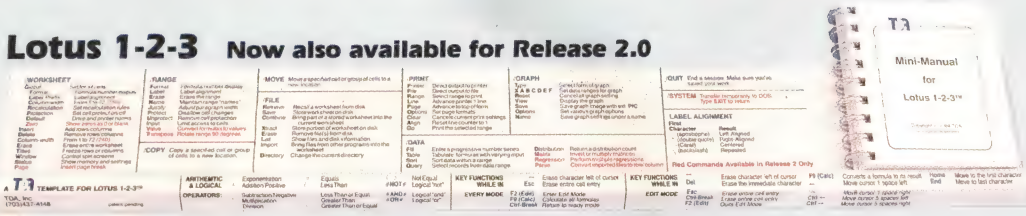

1 The surface of each template shows the complete menu structure of the program. It also includes such things as page number references to the Mini-Manual, cursor controls for various environments, etc.

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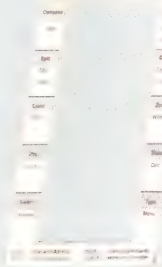

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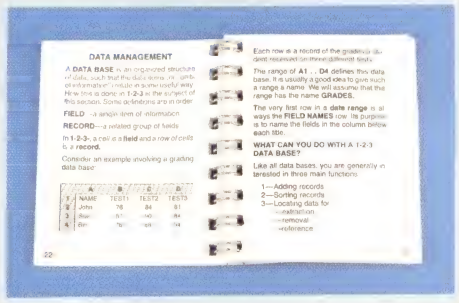

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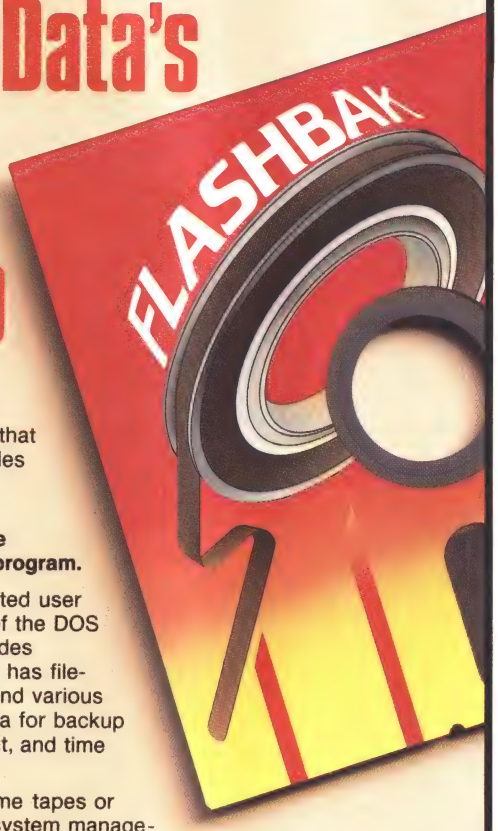

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Sowing a Random FIELD

Q. *BASIC 2.0 supports random file record lengths up to 32,767 bytes. I would like to use a random file structure to store 2048 single-precision values (8192 bytes) per record but cannot figure out how to cram enough* xx *AS* y$, *clauses into one 255-character FIELD statement. What's the secret?*

Jon Krogh
Knoxville, Iowa

A. The secret was revealed in the BASIC 3.0 manual's discussion of the FIELD statement. The trick is using multiple FIELD statements. Consider the following example:

```
1 open "foo" as #1
2 field 1, 100 as a$, 200 as b$
3 field 1, 300 as dummy$, 40 as c$
```

Note that line 3 uses a dummy variable to move the file buffer's pointer past the area assigned for a$ and b$ (100 + 200 = 300) so that the field definitions of line 2 are not lost.

Zeroing In on Missing Data

Q. *I recently obtained* dBASE III *to store a large data base of water quality data. Each record holds the geographical location of a water source and information on the concentration of about 50 different chemicals in the water, from arsenic to iron.*

However, not every record is complete. For some sources, I have

(continues)

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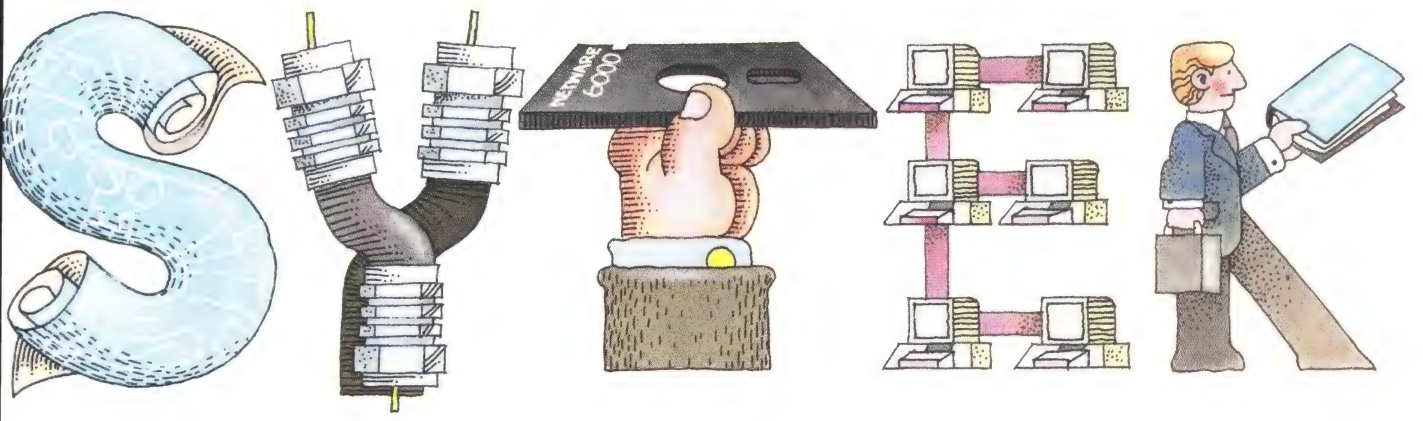

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data on only a few chemicals, so a number of fields in a record must remain blank until more measurements are taken. Other fields contain 0s to indicate that certain contaminants are not present in a tested sample.

Much to my dismay, I discovered that after I modified the data base, all the blanks in numeric fields were filled with 0s. Anyone who works with numeric data knows there's a big difference between a 0 and a blank.

The technical staff at Ashton-Tate says that the only solution is to convert all the numeric fields to character fields. This solves the problem but makes arithmetic operations unwieldly at best.

Prospective dBASE *users should be aware of this significant limitation. Is there an efficient way to overcome it?*

Terry Rich
Dickinson, North Dakota

A. As far as I know, this "limitation" is part of every data management program's design. When a field is defined as numeric, it must be given a default value of zero. Otherwise, the bytes assigned to that field represent some other number. Character fields are no different—they are initially filled with spaces and therefore are not truly blank.

Because your particular application will never record a negative concentration of contaminants, you could use −1 to signify that data for a given chemical has not been obtained. This leaves the fields numeric, so arithmetic operations shouldn't be too ungainly, although you will have to add code to exclude the −1 placeholders from your calculations.

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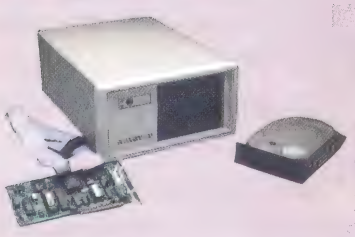

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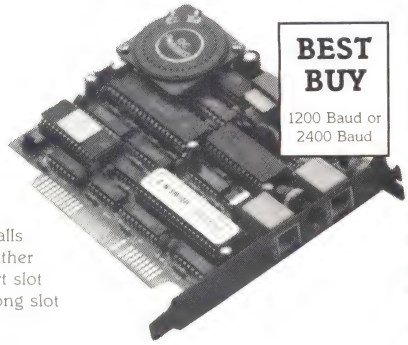

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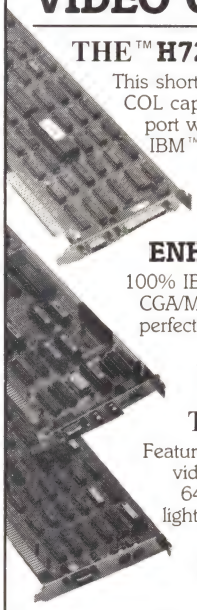

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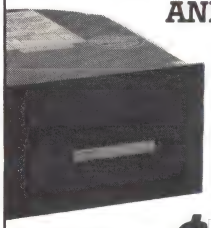

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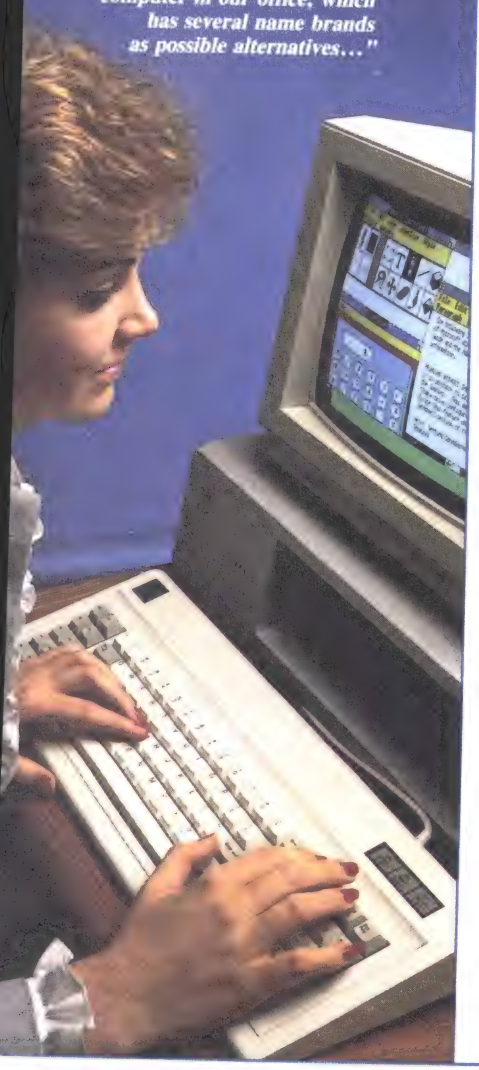

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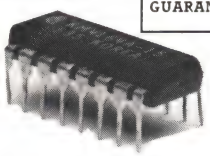

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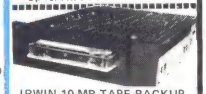

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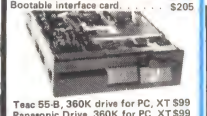

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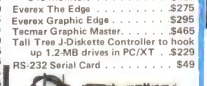

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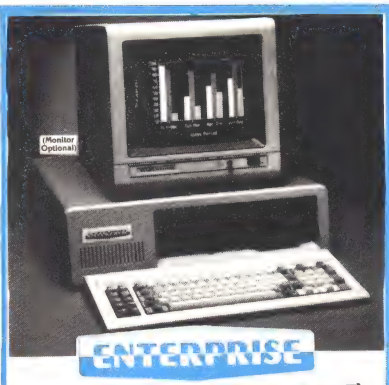

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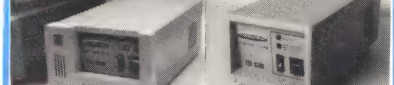

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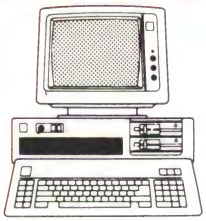

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Circle 908 on reader service card

Star-Dot-Star

A global exchange of personal computer discoveries

This month: faster letters with WordPerfect, the secret of secret file names, ECHOing commands to your printer, classy Pascal printer control, and more

Edited by Steven Cook

WordPerfect Envelopes

I've been using *WordPerfect 4.1* for about a month. At first, I thought the Type-Thru mode (which turns a PC and printer into a typewriter) was a handy way to address envelopes. But after typing hundreds of addresses twice–first in word processed letters, then on the envelopes–I figured there had to be a better way. So I wrote a macro that essentially copies the address from a word processed letter and prints it on an envelope.

To create the envelope-printing macro (called <Alt>-E), follow the steps shown in Figure 1. Step 1 starts the macro definition; steps 2 and 3 create a blank page of one line just above the address; steps 4 through 7 block out space for the address (you can add as many lines as you need), highlight the address, and place a temporary copy in memory; step 8 moves to the blank page created in step 3; step 9 sets the margins for letter-size envelopes so the printer knows where to start printing; step 10 retrieves the address at the preset margins; step 11 prints the address on the envelope; step 12 returns the cursor to the beginning of the line before any hidden codes; step 13 deletes the address from the page; step 14 deletes the hard page breaks at the top and bottom of the page and returns the cursor to its previous position in the letter; step 15 ends the macro definition.

To position the address precisely on the envelope, place the cursor at the beginning of the address in the letter, press <Alt>-E, and presto, the envelope is addressed.

Terry Boss
Grand Rapids, Michigan

Secret File Names

At work I share a PC with several relatively new users, and I've been looking for an easy way to make my files and subdirectories inaccessible to them. I tried without success to embed nontypeable characters within subdirectory and file names by pressing and

(continues)

```
1.  < Ctrl > - < F10 >  < Alt > -E
2.  < CursorUp >
3.  < Ctrl > - < Enter >  < Ctrl > - < Enter >
4.  < CursorDown >
5.  < Alt > - < F4 >
6.  < CursorDown >  < CursorDown >  < CursorDown >  < End >
7.  < Ctrl > - < F4 >  2
8.  < PgUp >
9.  < Shift > - < F8 >  3 45  < Enter >  85  < Enter >
10. < Ctrl > - < F4 >  5
11. < Shift > - < F7 >  2
12. < Home >  < Home >  < Home >  < CursorLeft >
13. < Ctrl > - < PgDn >  Y  < Del >
14. < Backspace >  < Del >
15. < Ctrl > - < F10 >
```

Figure 1: WordPerfect envelope-printing macro

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holding the <Alt> key while typing the character's ASCII value on the PC's numeric keypad. Unfortunately, DOS converts such values into valid characters. With the help of *SideKick* and *SuperKey*, however, I was able to devise the following technique.

Load *SuperKey* and then *SideKick*, and then display *SideKick*'s ASCII table by pressing <Ctrl>-<Alt> (to bring up the program) and then <F6>. Scroll through the table with the cursor keys until you find a nontypeable character to your liking. (Don't choose characters with ASCII values less than 32–*SuperKey* interprets these as control characters.)

Select *SuperKey*'s cut-and-paste mode by pressing <Alt>-], and in response to the prompt pick a key combination, such as <Ctrl>-0. Place the cursor under the desired character in the ASCII table and press B to begin the cut, followed immediately by <Enter> to end it. Press <Ctrl>-0, and the nontypeable character will be generated.

For example, to create a subdirectory called MY-SUB with an embedded ASCII 232 character in place of the hyphen, you would first cut and paste character 232 from *SideKick*'s ASCII table as described above, assign it to a key combination (such as <Ctrl>-0), and at the DOS prompt, type MD MY<Ctrl>-0SUB <Enter>.

You can also create file names with embedded characters for *dBASE III, Multiplan, WordPerfect,* and *WordStar.* (*1-2-3* releases 1A and 2, however, will not accept these characters.) In *WordStar,* nontypeable characters are displayed–ASCII 232 is represented by the letter *H*–but they still prevent unauthorized access.

Scott Simmons
Santa Ana, California

*Editor's note: Of course, these files and subdirectories can easily be cracked open with popular disk utilities or even with programs that offer a list of file names for the user's selection. Although keeping prying eyes from your sensitive files may be important, it's far more likely that an inexperienced user will accidentally delete your files by carelessly using a DOS wild card. The command DEL *.*, for example, will delete all files (except those made read-only with the ATTRIB command)–even those protected with special characters.*

ECHO Printer Control

You can use the ECHO command with the redirection symbol > to send escape sequences and control codes to a printer. This technique works from within batch files, or you can type the commands directly from the keyboard.

Most printer control sequences begin with the escape character; however, pressing <Esc> while issuing a DOS command cancels that command. The trick is to use the ASCII 155 character, which many printers interpret as a normal escape character. To generate the character, hold the <Alt> key down while entering 155 on the numeric keypad.

Enter the remainder of the printer control sequence immediately after the escape character, without any intervening spaces. You can type any character, or you can hold down the <Alt> key and enter a decimal ASCII character value directly on the numeric keypad.

For example, to send the sequence Escape E to trigger emphasized printing, you would type ECHO followed by a space, hold down the <Alt> key while typing 155 on the numeric keypad, release <Alt>, and then type E, a space, and >PRN. This last part of the command redirects output of the ECHO command to the printer instead of the screen.

The printer must be in "character set" mode so it will recognize the escape sequence as printer control code. Otherwise the characters will print instead of controlling the printer. On an IBM Proprinter, for instance, you must send all of the control codes before selecting character set 2 (character set 1 is the default).

Note, too, that a single ECHO command can send more than one escape sequence. For example, if you want to select 12-pitch, double-strike, underlined printing, the escape sequence for an IBM Proprinter would be <Esc> : <Esc> G <Esc> −1.

You may want to include frequently used printer control sequences in your system's AUTOEXEC.BAT file to configure the printer automatically whenever you turn on the computer.

David F. Burke
Lexington, Kentucky

(continues)

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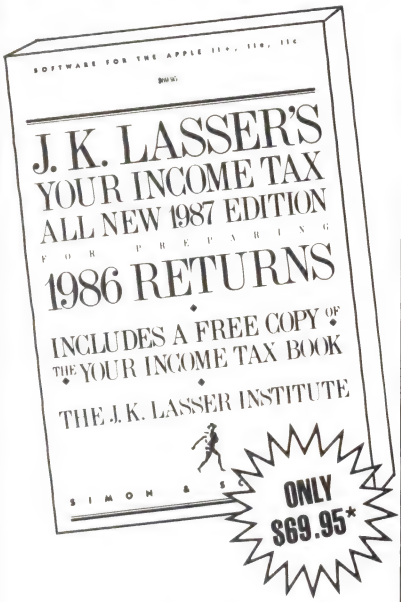

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Pascal Printer Control

After seeing several printer control programs in *PC World*, I wrote the Turbo Pascal (version 3.0) program PRINTER.PAS [shown in Listing 1]. The printer codes are for the IBM Graphics Printer and can be easily modified to accommodate most IBM and Epson printers.

When the program begins, it cancels all previous printer commands, and then displays a menu showing the current status of various print modes. Simply press the appropriate letter to switch a mode on or off.

Joseph J. Morscher, Jr.
Glendale, New York

Editor's note: You can compile PRINTER.PAS with Turbo Pascal and save the result as a .COM file.

(continues)

```
(* The printer commands are mostly contained in procedures and can be
   modified by changing them to the appropriate printer codes.  These
   printer codes are for the IBM Graphics Printer.*)


Program printer(input,output);

(*B- *)

type StatusType=string[3];

var Choice:char;

    DWidth,Compress,Under,Emphas,
    DStrike,UDir:StatusType;

procedure SetUp;

  var Continue:char;

  begin
    ClrScr;   (* Clear Screen *)
    writeln;
    writeln;
    writeln;
    writeln('  You will have to press a letter');
    writeln('for a printer command to turn off/on.');
    writeln;
    writeln;
    writeln('PLEASE MAKE SURE THE PRINTER IS ON!');
    writeln;
    writeln;
    writeln('Press ANY key to Continue!');
    repeat until KeyPressed;
    ClrScr;   (* Clear Screen *)
  end;   (* SetUp *)

procedure Wide;
  begin
    if (DWidth='On') then DWidth:='Off'
                     else DWidth:='On';
    if (DWidth='On') then write(Lst,chr(27),chr(87),chr(1))
                     else write(Lst,chr(27),chr(87),chr(0));
```

(continues)

Listing 1: PRINTER.PAS, the Pascal printer control program

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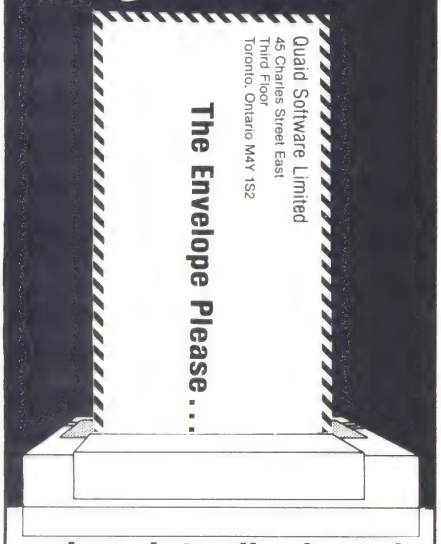

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```
  end;   (* Wide *)

procedure Compressed;
  begin
    if (Compress='On') then Compress:='Off'
                       else Compress:='On';
    if (Compress='On') then write(Lst,chr(15))
                       else write(Lst,chr(18));
  end;   (* Compressed *)

procedure Underline;
  begin
    if (Under='On') then Under:='Off'
                    else Under:='On';
    if (Under='On') then write(Lst,chr(27),chr(45),chr(1))
                    else write(Lst,chr(27),chr(45),chr(0));
  end;   (* Underline *)

procedure Emphasize;
  begin
    if (Emphas='On') then Emphas:='Off'
                     else Emphas:='On';
    if (Emphas='On') then write(Lst,chr(27),chr(69))
                     else write(Lst,chr(27),chr(70));
  end;   (* Emphasize *)

procedure Double;
  begin
    if (DStrike='On') then Dstrike:='Off'
                      else Dstrike:='On';
    if (DStrike='On') then write(Lst,chr(27),chr(71))
                      else write(Lst,chr(27),chr(72));
  end;   (* Double *)

procedure UniDir;
  begin
    if (UDir='On') then UDir:='Off'
                   else UDir:='On';
    if (UDir='On') then write(Lst,chr(27),chr(85),chr(1))
                   else write(Lst,chr(27),chr(85),chr(0));
  end;   (* UniDir *)

procedure CancelAll;
  begin
    write(Lst,chr(27),chr(87),chr(0)); (* Double Width *)
    write(Lst,chr(18));                (* Compressed *)
    write(Lst,chr(27),chr(45),chr(0)); (* Underlining *)
    write(Lst,chr(27),chr(70));        (* Emphasized *)
    write(Lst,chr(27),chr(72));        (* Double Strike *)
    write(Lst,chr(27),chr(85),chr(0)); (* Unidirectional *)

    DWidth:='Off';Compress:='Off';Under:='Off';
    Emphas:='Off';DStrike:='Off';UDir:='Off'
  end;   (* CancelAll *)

procedure Menu;
  begin
    ClrScr;
    writeln;
    writeln('    PRINTER OPTIONS ');
    writeln('    --------------- ');
    writeln;                                (* 15 dots on line below *)
    writeln('double Width ',DWidth:4  ,'................W');
    writeln('Compressed   ',Compress:4,'................C');
    writeln('Underlining  ',Under:4   ,'................U');
```

(continues)

Listing 1 *(continued)*

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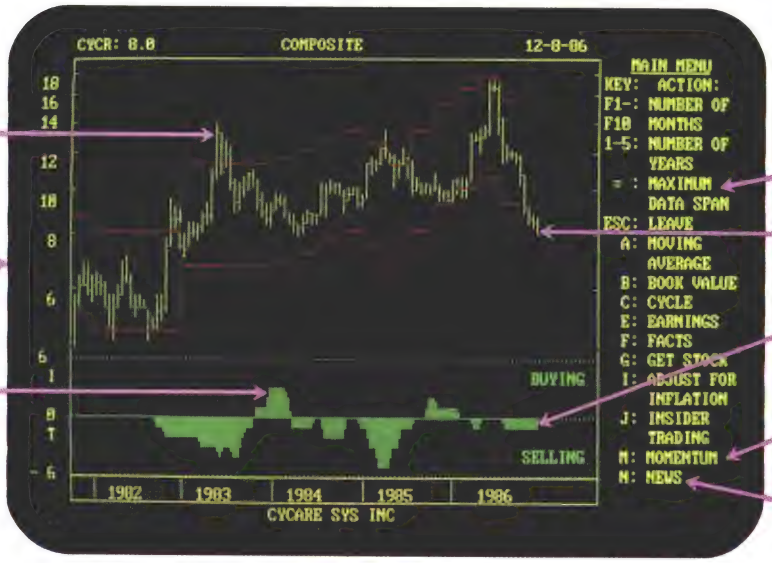

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```
    writeln('Emphasized   ',Emphas:4  ,'................E');
    writeln('double Strike',DStrike:4 ,'................S');
    writeln('uniDirection ',UDir:4    ,'................D');
    writeln('Form Feed.......................F');  (* 23 dots *)
    writeln('cancel All commands.............A');  (* 13 dots *)
    writeln('EXIT............................X');
    writeln;
    writeln
  end;   (* Menu *)


begin  (* <<<<< MAIN BLOCK >>>>> *)

      (* INITIALIZE *)

  DWidth:='Off';Compress:='Off';Under:='Off';
  Emphas:='Off';DStrike:='Off';UDir:='Off';
  Choice:=' ';

  SetUp;
  CancelAll; (* Cancel previous commands. *)

  while (Choice<>'X') do
    begin
      Menu;
      write('Enter your choice: ');
      readln(Choice);
      Choice:=upcase(Choice);
      writeln;
      case choice of
        'W': Wide;       (* Double Width *)
        'C': Compressed;
        'U': Underline;
        'E': Emphasize;
        'S': Double;     (* Double Strike *)
        'D': UniDir;     (* left to right only or both *)
        'F': write(Lst,chr(12));    (* Form Feed *)
        'A': CancelAll; (* Cancel All Commands *)
        'X': writeln('EXITING....');
        else
          begin
            writeln('TRY AGAIN!!');
            Delay(2000);  (* Delay for 2000 milliseconds *)
          end    (* else *)
      end      (* case *)
    end      (* while loop *)
end.  (* <<<<< MAIN >>>>> *)
```

Listing 1 *(continued)*

Format on the Double

I frequently have to format a number of floppy disks at one sitting. To speed up this time-consuming process, I developed the batch file FORMATAB.BAT [Listing 2] so I can change the disks in one drive while formatting a disk in the other.

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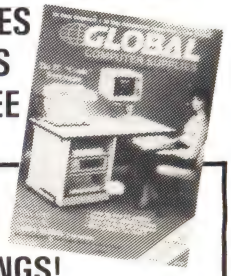

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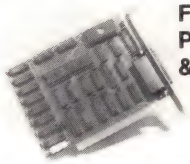

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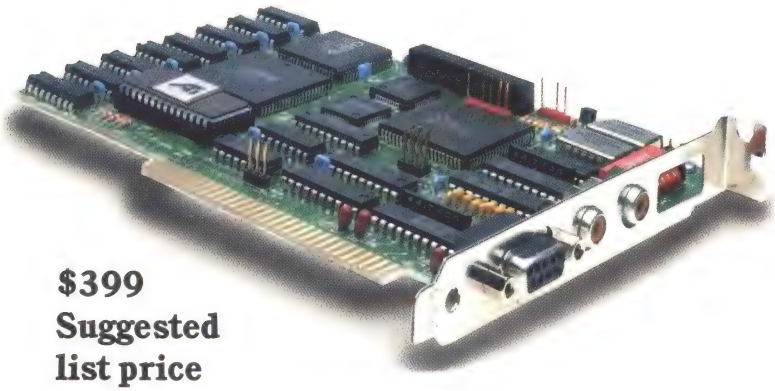

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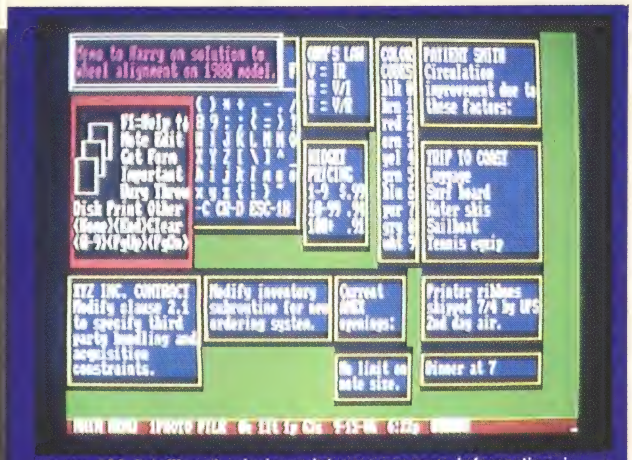

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```
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Cls
Echo ************************************************************
Echo *  Place The First Diskette to be Formatted into Drive A.  *
Echo ************************************************************
Pause
Cls
:Loop
Echo
Echo
Echo
Echo
Echo ************************************************************
Echo *  Place The Next Diskette to be Formatted into Drive B.  *
Echo ************************************************************
Echo ^G
Format A: <C:KEYS.DAT >nul
Vol A: >nul
Echo
Echo
Echo
Echo
Echo ************************************************************
Echo *  Place The Next Diskette to be Formatted into Drive A.  *
Echo ************************************************************
Echo ^G
Format B: <C:KEYS.DAT >nul
Vol B: >nul
Goto Loop
```

Listing 2: FORMATAB.BAT, the dual-drive disk format batch file

```
100 OPEN "C:KEYS.DAT" FOR OUTPUT AS #1
110 PRINT #1, CHR$(13); "n"; CHR$(13); CHR$(3)
120 CLOSE #1
130 END
```

Listing 3: KEYS.BAS. Use this BASIC program to create a keystroke file for use with dual-drive disk formatting.

empty. To use the batch file, you must have a hard disk or a RAM disk holding FORMATAB.BAT, DOS's FORMAT.COM file, and KEYS.DAT.

When you are typing FORMATAB.BAT, you can generate the Control G character (the bell) by holding down the <Alt> key and pressing 7 on the numeric keypad. Control G rings the PC's bell when it's time to change disks. To halt execution of FORMATAB.BAT, simply leave a disk drive door open. When the 'Not ready error reading drive *n*, Abort, Retry, Ignore?' message appears, press <Ctrl>-<Break>. When you are asked if you want to terminate the batch file, press Y, and the DOS prompt will appear.

Brian D. Kelly
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(continues)

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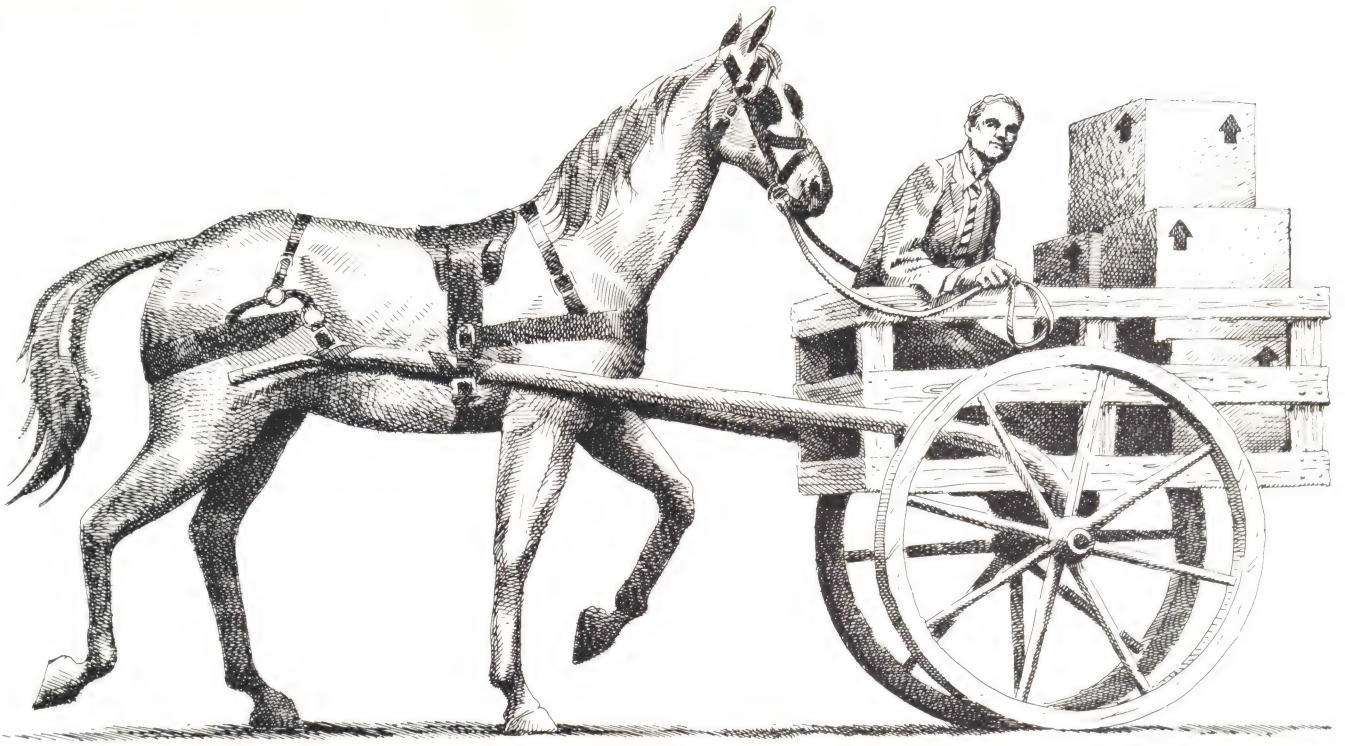

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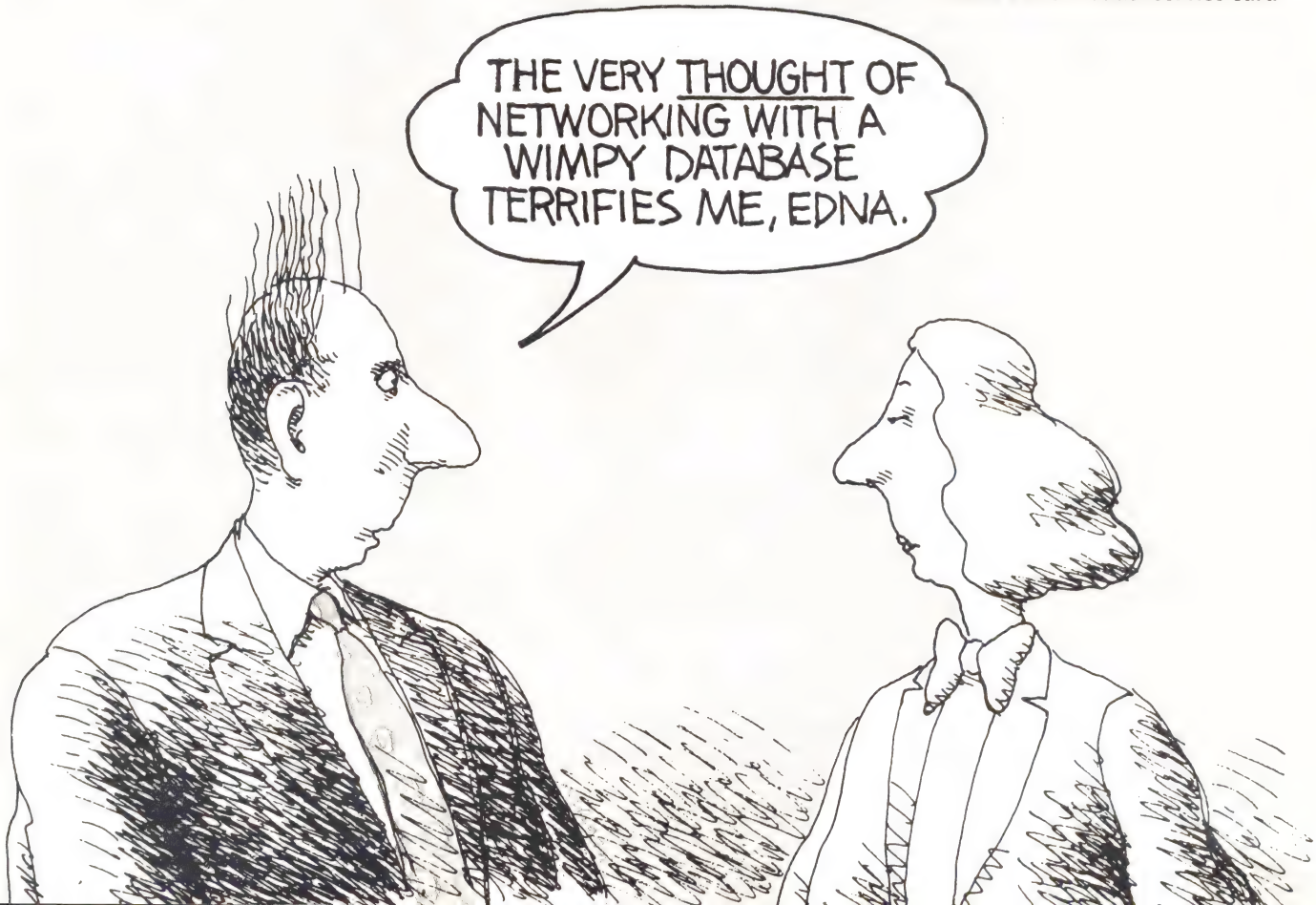

```
prompt $e[s$e[24A$e[1D$e[K$e[7m$p.....$t$h$h$h.....$d...$e[m$e[u$n$g
```

Listing 4: An informative DOS prompt

Proprinter Pointer

If you try to print anything wider than 8½ inches on IBM's recently released wide-carriage Proprinter, you're likely to encounter problems. For some reason, IBM sets the printer's switches at the factory for 8½-inch-wide paper (80 columns). Since the printer's raison d'être is printing on wider paper, IBM's actions are curious indeed.

Unless you understand escape code sequences, the easiest solution is to set printer switch number 1 to the 'On' position for wide paper.

Dan Domzalski
Buffalo Grove, Illinois

Informative DOS Prompt

I was quite taken with the ANSI-.SYS device driver that draws the flag of Texas as a DOS prompt [see "Lone Star Look," *.*, *PCW*, September 1986]. I've used the same technique to create a prompt that displays the current directory, time, and date in a bar at the top of the screen. Since the bar is part of the DOS prompt, every time you press <Enter> or issue a DOS-level command, all three items are immediately updated.

When you type in the necessary instructions [see Listing 4], make sure you substitute a space for each of the dots and type every letter exactly as shown, paying attention to uppercase and lowercase. Make sure that PROMPT is followed by only one space.

Mark Aramli
Manchester, Connecticut

Editor's note: Don't forget to install ANSI.SYS by placing the command **device = ansi.sys** *in the CONFIG.SYS file on the DOS disk used to start the system (see your DOS manual for details).*

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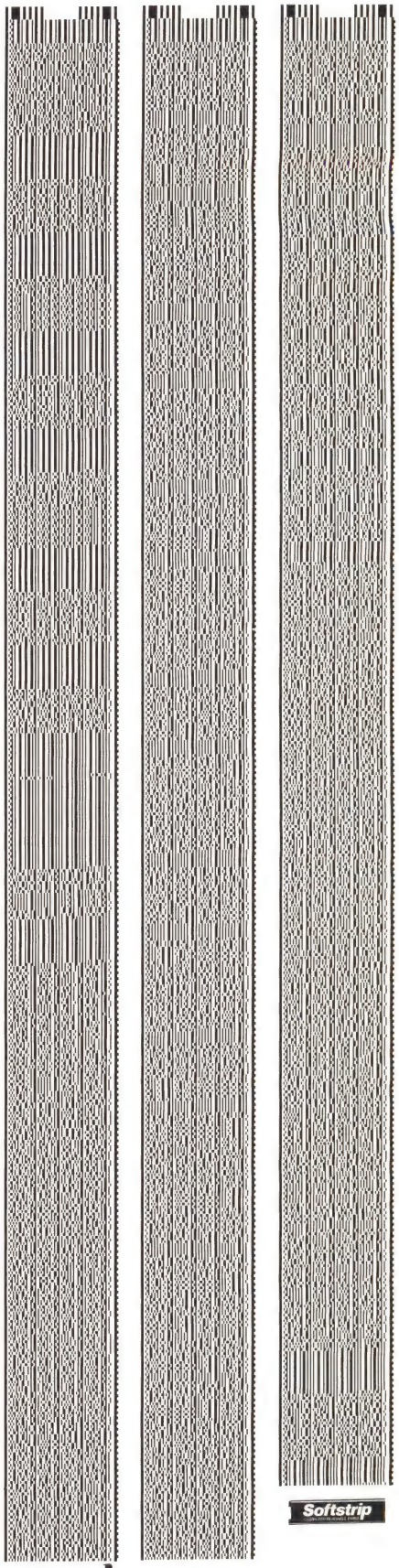

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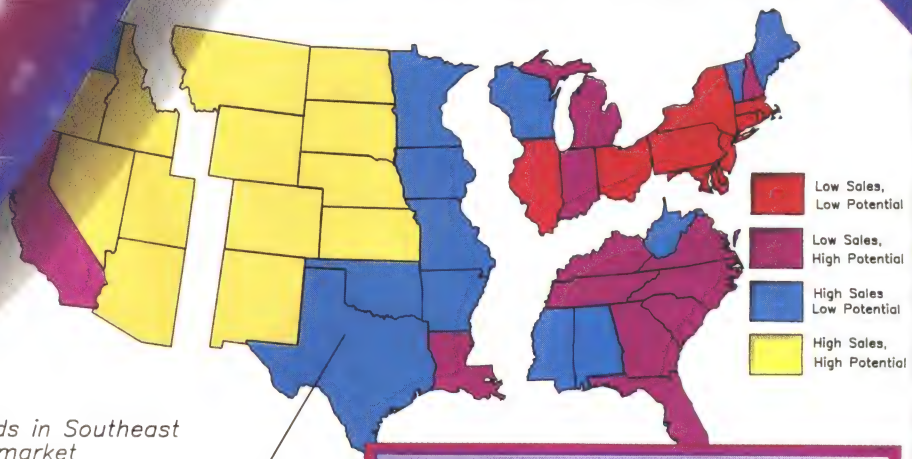

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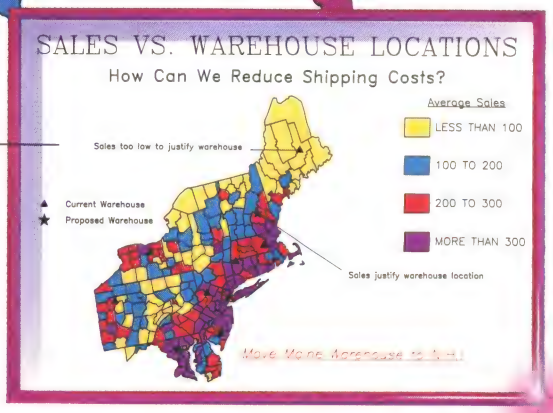

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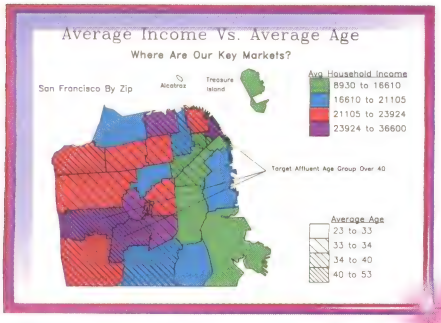

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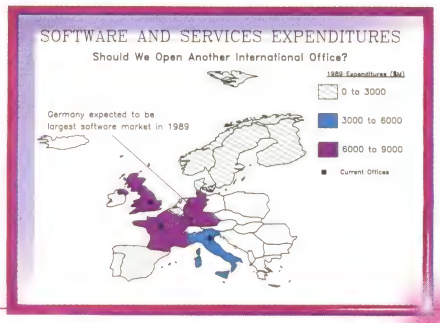

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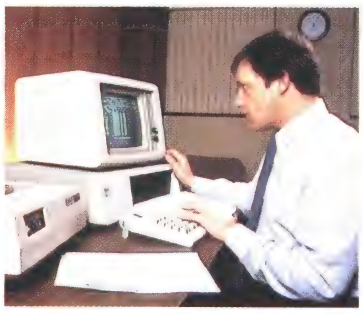

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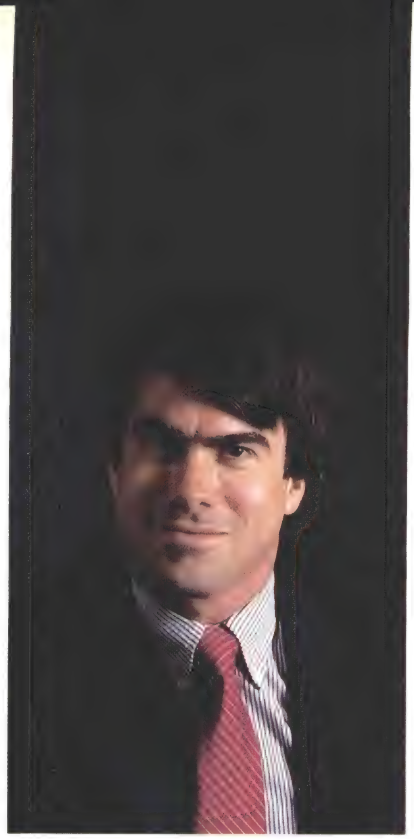

Kevin Strehlo

Going Under the Hood

Rebuilt for its new role, the souped-up PC passes some warning signs on the highway toward designer documents.

People always expect computer columnists to own the latest, greatest hardware. After all, writers for car magazines don't collect old Ramblers or drive 5-year-old sedans, do they?

But in reality, we gather terrific collections of outdated junk. Even my primary work machine has been nothing to brag about—an old IBM PC with a monochrome display and a dot matrix printer.

I was content with this combination, which adequately handled my writing, programming, time scheduling, accounting, and budgeting chores. I carefully avoided working on 80286 machines. I'd never been to Paris, so it was easy to keep me down on the farm.

Then along came desktop publishing.

From the moment I booted *Microsoft Windows* and Aldus's *PageMaker,* my PC was a goner. I loved the new software, even though it turned my machine into a lumbering snailosaurus, a backroads anachronism in a freeway world. My PC became extinct in no more time than it took to recompose a complex page—a few excruciating minutes.

Although convinced that Intel's 80386 chip is the ticket to the future, I decided to soup up the old PC with an 80286 speed-up card to tide me over until 386 prices came down.

Not that my machine was chopped liver, at least as five-slot, 4.77-MHz IBM PCs go. I had added a 20MB hard disk and an Intel AboveBoard PS with 1.5MB of expanded memory. I'd even swapped the original anemic 63-watt power supply for a 135-watter, thereby curing a rash of parity-check memory errors.

Left to my old software, I would still have been a happy man. But desktop publishing pushed me into hot-rodding, and I've been under the hood ever since.

There's something about an 8-MHz 286 with cache memory that offers the same allure as a bored-out 389 V-8 engine; and a well-designed page can give me as

(continues)

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Unfortunately, desktop publishing may prove about as practical —for me and possibly for you—as driving a snorting, fire-engine-red jalopy.

Like the hot-rodders who add a roll bar before they hit the road in their overpowered creations, I began the overhaul by building in protection against a sudden crash. I pulled my Western Digital hard disk controller and internal hard disk drive for a dual-drive card and external chassis. Suddenly I had 40MB of storage. Adding Tallgrass's *Backtrack* software, which automatically backed up one hard disk to the other whenever I wasn't working, protected me from any wackiness introduced by extra speed.

Now the trouble was that my modem, floppy controller, hard disk controller, and AboveBoard and monochrome graphics cards filled all five slots. My choices were limited.

I considered one of the speed-up kits that increase the 8088's clock speed without taking up a slot, and even borrowed one from a friend to try. The result reminded me of a turbocharged Volkswagen Bug—even a 70 percent performance boost couldn't turn that little engine into a screamer. ATs would still leave me in the dust, and *Windows* would still make me wait and whimper.

The solution, I decided, was to replace my graphics card with an Orchid Turbo EGA, a card that

(continues)

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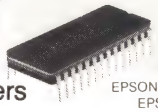

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combines a 286 with a graphics controller. I knew that some software had trouble running while the Turbo 286's cache memory was operating, but the extra speed seemed worth the risk.

The difference was noticeable even with my old software. Directories scrolled by faster than I could read them. Programs booted before I could swallow a sip of coffee. Suddenly *Framework II* telecommunications kept pace with my 1200-bps modem.

Running *Windows*, the difference was extraordinary. *Windows'* hour glass became a three-second timer. Doesn't a powerful car make you want to drive fast? My new turbo made me want to just sit and watch how quickly *Windows Draw* could resize the Golden Gate Bridge.

I could never return happily to an 8088 again. Still, my machine didn't triple its speed all that smoothly.

The new configuration had two floppies and two hard drives, which meant the *Framework* desktop should display four drives, right? Wrong. It displayed six. I checked with DOS and discovered that my two hard drives were dubbed E: and F:. A quick directory check of drives C: and D: revealed that they were phantoms.

This turn of events was inexplicable, but only slightly inconvenient—like a hot rod shaking at a stoplight. In no time I rewrote my batch files and navigated around the two ghost drives.

What I couldn't live with, however, was the sudden appearance of a lock-up gremlin that ate files unpredictably. Every once in a

(continues)

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while, when I tried to save a file, my hot new Turbo would freeze. Upon rebooting the machine, the file I'd been trying to save would be gone.

I came up with half a dozen equally reasonable scenarios and went with the simplest explanation first: a heat-related failure. Sure enough, the machine never locked up until it had been on at least 30 minutes—or an hour if I ran it with the lid off.

My souped-up machine was hot, all right. Even though I liked the look of the Turbo EGA's 80286 and the two huge Chips and Technologies VLSI chips, that impressive radiating surface was vaporizing my files. Apparently, my disk controller card was too sensitive to operate properly next to this blast furnace.

My interim solution was simple but noisy: I plugged in a portable fan and let it blast away at my PC's internals. That left me listening to the unmuffled hum of my desk fan, the whine of two hard disks and the fan in their external chassis, and the low rumble of the system fan. Although I could no longer hear Federal Express ring the doorbell, it solved the problem.

A more elegant solution was PC Cooling's TurboCool fan, which fit on the vent of my new power supply. When the fan's screws failed to fit the holes of my power supply, a quick trip to three hardware stores produced the right screws. I was back in business.

Oh, there were other little annoyances.

(continues)

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Manuscript is Lotus' new technical word processor, written to run optimally on the Hercules Graphics Card Plus.

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And our high resolution text mode that runs thousands more programs.

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Here are a few of the programs taking advantage of RamFont.

Lotus 1-2-3 Release 2 (and later)
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Microsoft Word 3.1 includes mouse support
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For a complete list, contact Hercules.

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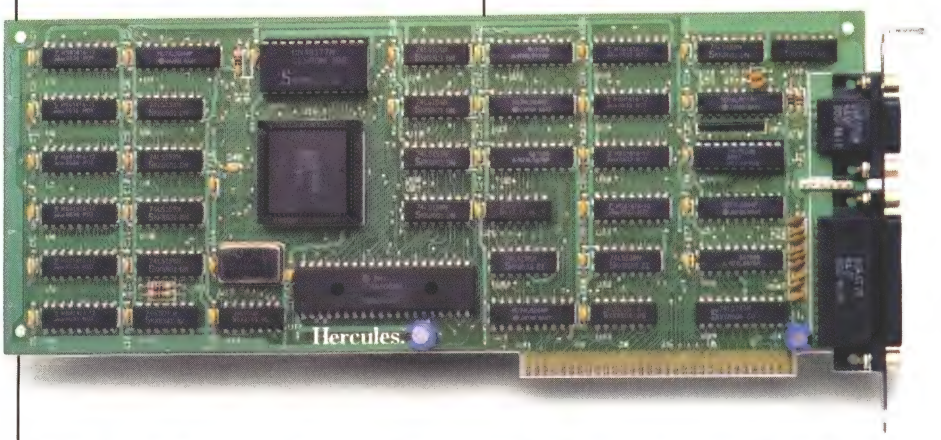

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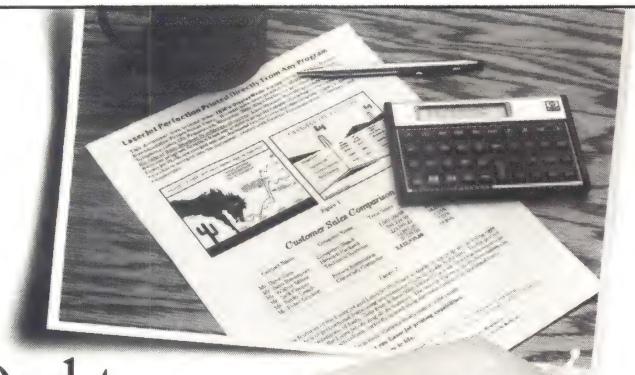

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I depend heavily on a to-do program I'd written in FRED, *Framework*'s programming language, but FRED functions grew ever more flaky when my machine's cache memory was enabled. By chance I discovered that FRED worked fine if I ran *Framework* on top of Software Solutions' *Carousel*, a program designed for easy switching between applications. (Don't ask me why.)

Things were fine for a time. Then I ran into more hard-disk trouble. After the PC had been on for an hour or so, it would show 'General failure reading drive' messages when a program pulled in an overlay. Immediately suspecting the turbocharging, I didn't discover the real culprit until one of my two hard drives died. The fan in the external box had burned out.

Until my new fan arrives, I'm running the external chassis with its lid off in the breeze of my table fan—and once again I can't hear the doorbell ring.

Besides speed, you need a laser printer for desktop publishing, so I was not yet finished under the hood.

I knew where to pick up an Apple LaserWriter for a song, but first I'd have to free a serial port. The easiest approach seemed to be to replace the internal modem with a serial card. That way, I could share COM2 between the LaserWriter and the external Apple modem I already owned.

My first problem was the serial card's documentation, which included specs on the timing and

(continues)

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strength of signals to be expected on each of its 25 output pins, but no diagram or text explaining how to set the eight DIP switches for COM1 and COM2.

It was nighttime and I had something I needed to print; I couldn't wait until the store opened. There were only 256 possible combinations to try.

But even after I succeeded in switching on COM2, the LaserWriter wouldn't print. It was an early model, predating Apple's acceptance of the need for peaceful coexistence with IBM, and the manual lacked any specs for connecting to an IBM PC. It took half a dozen phone calls and an agonizing half hour in front of the most complete rack of cables in Silicon Valley to make that connection work.

Finally I was in business. After a half-day's work, I replaced a printed sheet explaining a program to new users with an attractive "typeset" page design that incorporated a screen image. When I set a story I was working on in Times Roman, it seemed to read better. And I was even able to design a new business form and my own wedding invitation.

No question, I was pleased with my powerful new hardware setup: *Windows* and *PageMaker* were great fun, and I was churning out some good-looking documents.

True, it bothered me a little that I'd spent about a thousand bucks as a stopgap until the price of 386-based machines comes down. And it was distressing to fork out more for a printer than the combined cost of a Macintosh Plus and a

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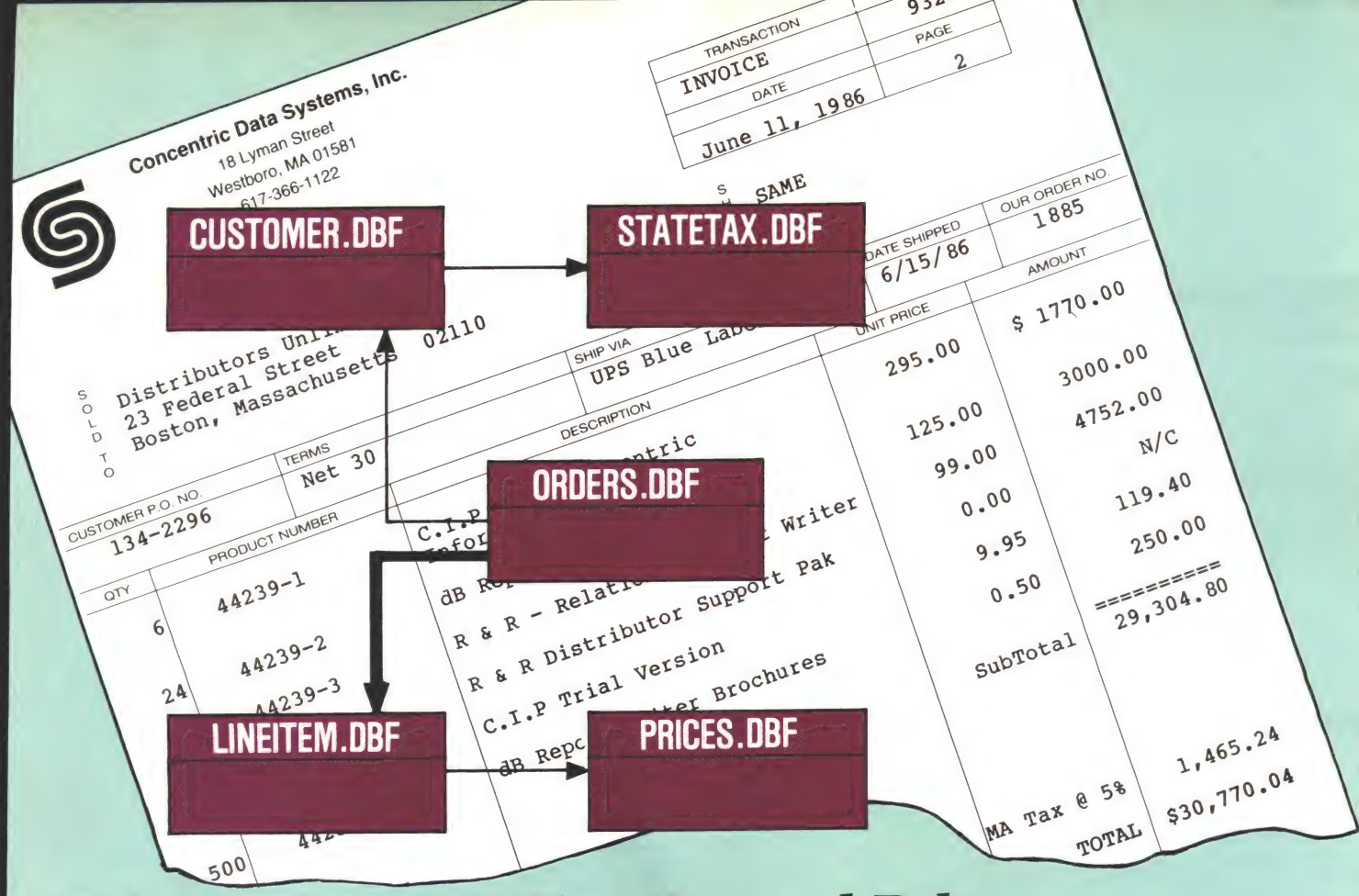

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Canon copier, although the Laserwriter is pretty much just a cross between those two (minus a display and disk drives).

But after spending another half-day making the changes to the wedding invitation suggested by my fiancée, I began to total up all I'd spent getting into desktop publishing. And time was at the top of the list. I was spending a lot more time at the wheel, even though my destinations hadn't changed.

Although I could have saved time by buying an AT compatible rather than spiffing up my PC, the hours spent doing and redoing layouts still mounted up.

Sure, I saved money by doing my own wedding invitations—and we probably got something closer to what we wanted—but it wasn't quick. And sure, my new invoices look great—but did the half-day I spent recreating my company logo result in faster payments? I could ask similar questions every time I boot *PageMaker*, although I'm usually too caught up in its spell to ask anything beyond design questions.

Is it worthwhile to raise expectations so that people will feel you're unprofessional if your printed material doesn't look as if it comes from a graphics designer? Do we really need to escalate this war of aesthetics?

It's funny how an arms race gets started. The first step was the elimination of white-out fluid from the face of the planet. Perfect daisy wheel output was de rigueur.

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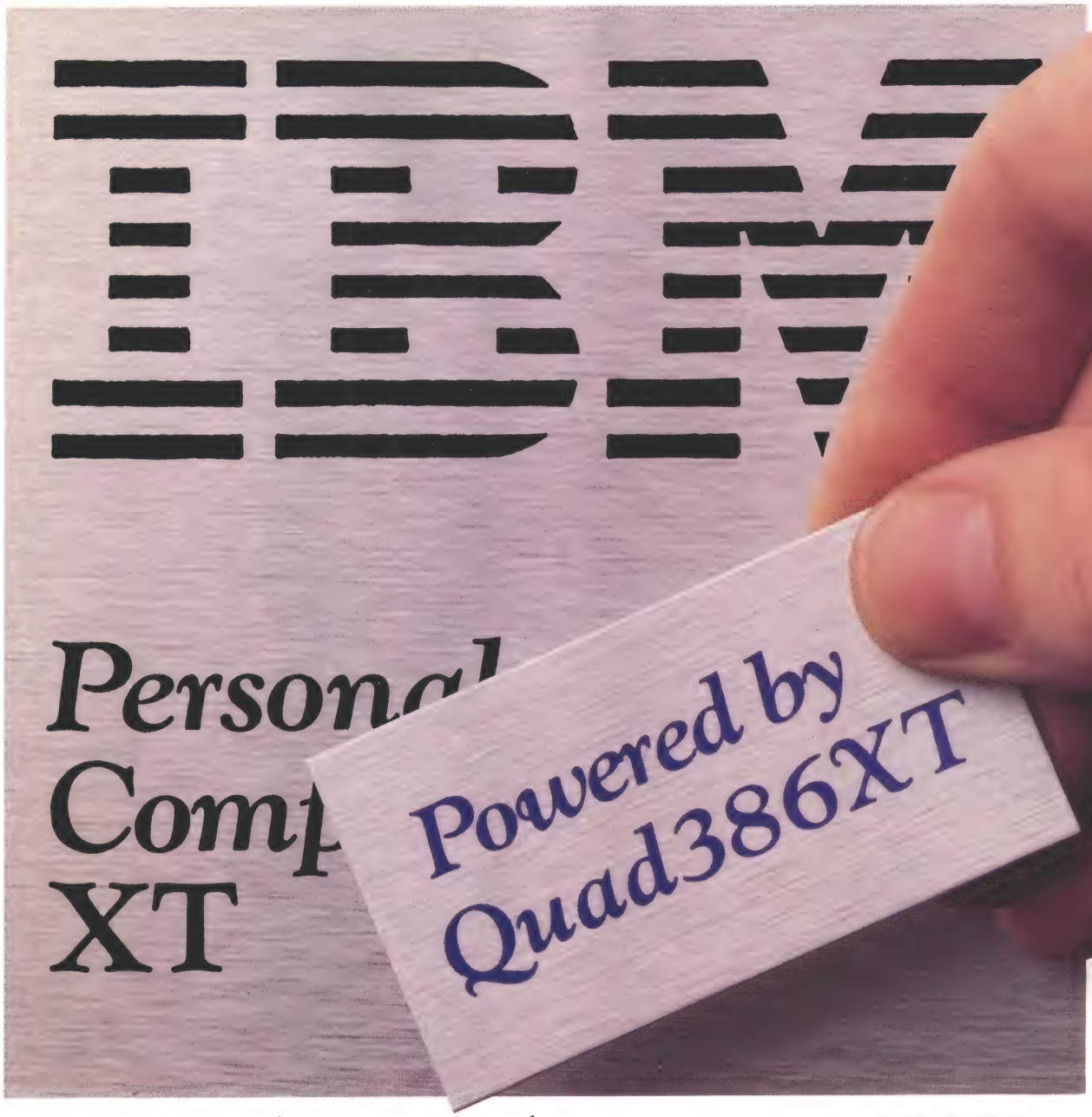

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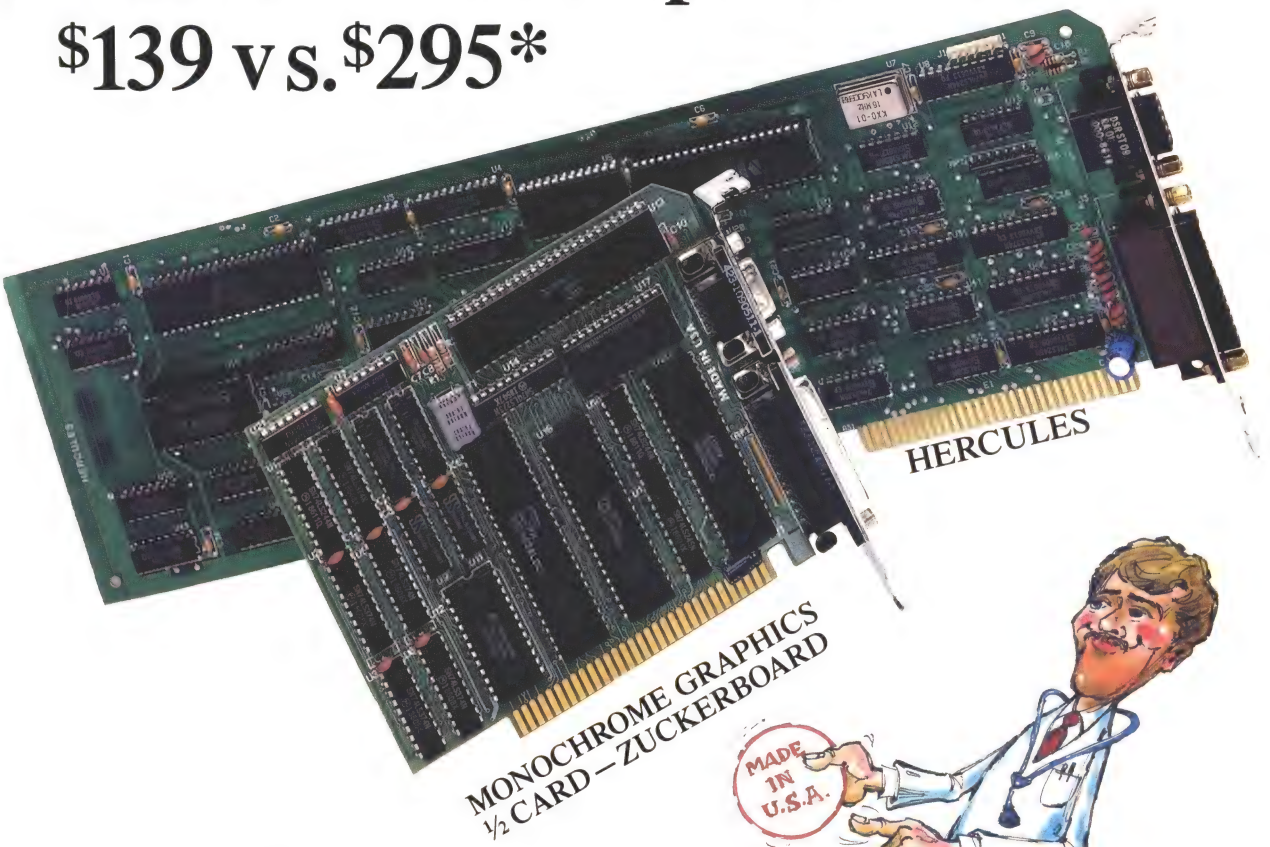

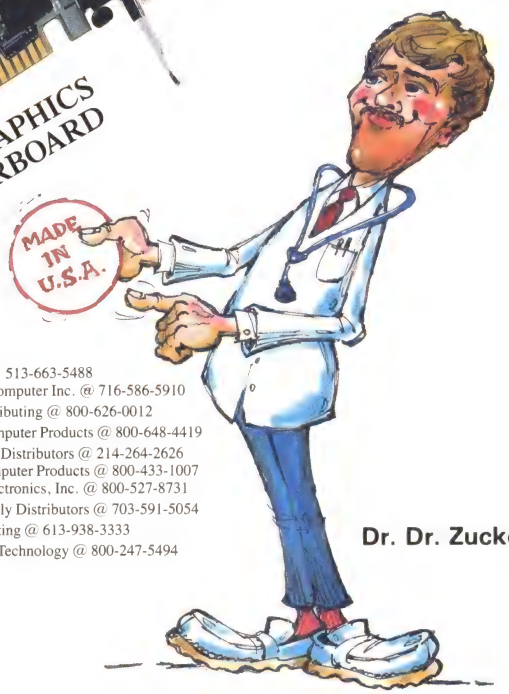

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Then, after some healthy backsliding into near letter quality dot matrix mode, the heavy artillery of laser printers rolled in. If your document wasn't designed with proportional spacing, that was an admission of corporate weakness. (Can't afford a laser printer, eh?)

And, if pundits like Steve Jobs are correct, soon even near-typeset quality won't cut it—word processing programs will include page composition as well.

What worries me is that none of this necessarily makes us any more productive. Presumably, no less time will be spent in preparing the content of documents, so where will the time spent considering form come from?

And anybody who has spent time grappling with an art department knows that when form is emphasized, it can dictate content. Text is altered to fit a layout. Or instead of going with the most meaningful headline, you choose the one that's exactly 26 characters long.

Was Marshall McLuhan just talking about TV when he said the medium was the message? Isn't it better to let the *message* be the message?

Maybe this is merely the kind of diatribe you'd expect from someone who has just spent three hours trying to center a 36-point Times Roman Italic *M* in white type within a black box.

Certainly, desktop publishing can cut the cost of producing documents, especially frequently revised documents. And in an expert's hand, an electronic pasteup

(continues)

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board may hold nearly the power of the pen.

But before you plunge into desktop publishing, make sure you know what you're getting into. Keep in mind the warning of Brad Canty, a desktop publishing specialist at Boeing Corporation: If word processing is like driving a bus, desktop publishing is closer to flying a Lear jet.

When was the last time you had something typeset? Why are typeset-quality documents suddenly necessary?

And if you do need to upgrade the appearance of your documents, is tackling the task yourself the best answer? Take a look at the *PageMaker* desktop's toolbox-and-pasteup-board metaphor. If you don't understand what's going on there, is it worth your while to learn? Do you repair your own car?

If you really need higher quality documents, can you simply feed your current documents to a laser printer without getting involved in the complexities of design? Or will one of the professionally designed formats offered by a package such as Software Channels's *SCLaser Plus* fill the bill? That package offers canned report formats that you can invoke by inserting a few simple codes into your text.

Finally, it may pay to think about why graphic artists like Kristen Ransom, a Palo Alto-based freelancer, love desktop publishing software but rarely create final, camera-ready art with it.

"It's so useful for visualizing designs, for selling ideas from the layout," Ransom says. Desktop publishing makes it easy for customers to visualize the final product, since the rough sketch produced by desktop publishing software is so close to the real thing. And it eliminates the redesigns necessary when clients don't understand what they're getting until they get it.

Nevertheless, Ransom sticks to traditional production methods for preparing camera-ready material because she can turn out a higher quality product.

In any case, desktop publishing gobbles up processor cycles, disk space, and time. Should I forget about this new turbocharged world of on-screen Times Roman, scroll bars, and attractive layouts? Would I be more productive with my slow-as-molasses PC, old-fashioned software, and dot matrix printer?

Unfortunately, it's too late to turn back. The graphic interface, the asymmetric (but balanced) page, and the laser printer hold me firmly in their grasp.

Kevin Strehlo hunts for PC tales from an office overlooking Silicon Valley; his latest opus, PageMaker: Desktop Publishing on the IBM PC and Compatibles, *will be available this month from Scott, Foresman.*

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1. Your primary job function:
a. Corporate or general manager
b. Department manager
c. MIS manager
d. Professional
e. Other

2. Number of employees in your company:
1. 25 or fewer
2. 26-99
3. 100-499
4. 500-999
5. 1000 or more

3. Plan to buy:
a. Now
b. In 4-6 months
c. In 7-12 months
d. More than 12 months from now
e. For reference only

4. For how many IBM PCs and compatibles do you buy products? (Include both company and personal units, please.)
1. 1
2. 2-4
3. 5-9
4. 10 or more

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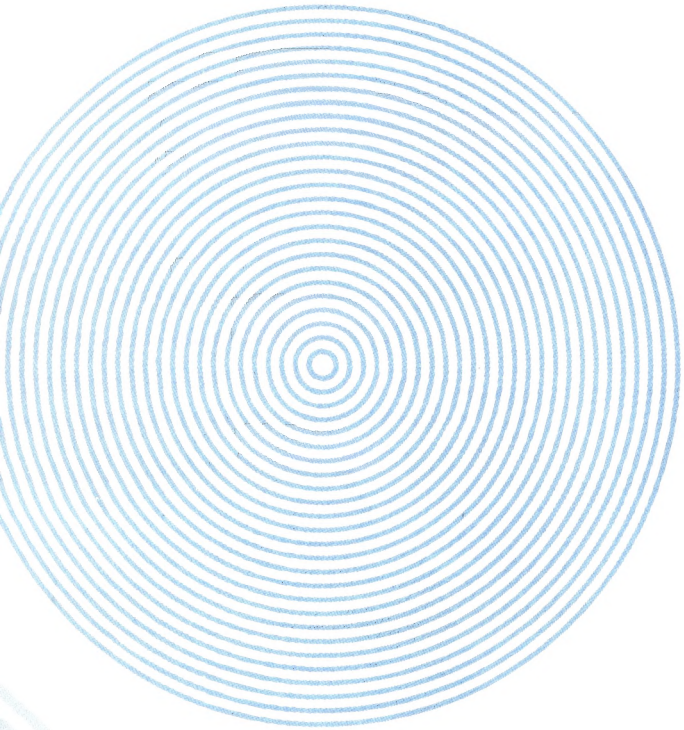
April Preview

Networks and CD ROM



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We invented the modem that makes fewer demands on your PC.

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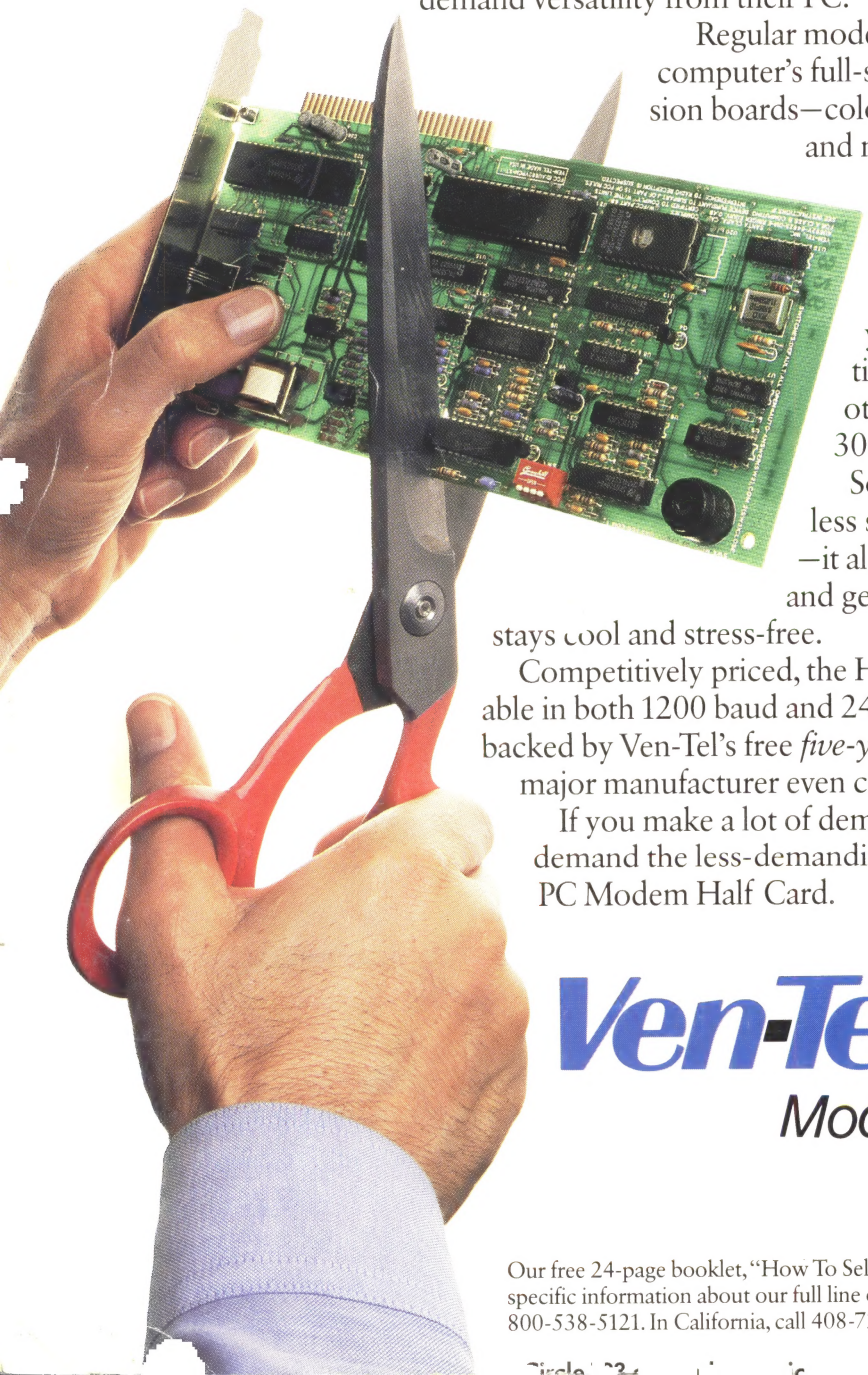

Regular modems plug into one of your computer's full-size slots. Just like expansion boards—color boards, graphics cards and memory expanders.

The Ven-Tel Half Card modem is different. It plugs into a short slot, freeing up a long slot so your PC can handle an additional function. And while other modems have about 300 components, ours has 70. So it not only demands less space from your computer—it also demands less power and generates less heat. Your PC stays cool and stress-free.

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Ven-Tel
Modems

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